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Antipredator response of free-roaming Aldabra giant tortoise (*Aldabrachelys gigantea*) with implications for responsible wildlife tourism in the Seychelles islands

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Abstract: I investigated the responses of Aldabra giant tortoises (*Aldabrachelys gigantea*) to human approach. Sex and ambient temperature were not found to have a significant effect on the distance at which tortoises became alert to human approach or the distance at which they initiated their characteristic head withdrawal response. Larger tortoises (measured by curved carapace length) became alert to human approach at greater distances, however there was no relationship between size and head withdrawal distance. I recommend that buffer zones of at least five meters should be implemented where human-tortoise contact is high, to reduce unnecessary stress and minimise effects on their behaviour. I also discuss the possible impacts of tourism on the ecosystem-restoration potential of Aldabra giant tortoises.

Introduction

The distance at which animals respond to an approaching threat is of interest to both behavioural ecologists and conservation practitioners. In most studies the parameter used to measure this is flight distance (FD) (Ydenberg & Dill 1986), the distance at which an animal flees.

Behavioural ecologists have focused on the optimisation of flight distances. Animals are expected to optimise the trade-off between chances of survival and the costs of disturbance, for example, through reduced foraging opportunities and energy expenditure. This tradeoff was first formally described by the Ydenberg and Dill model (Ydenberg & Dill 1986), which models how animals should flee when the cost of remaining is greater than the costs of fleeing.

As well as varying between species, flight distances can also vary within a species due to a range of variables. Studies across taxa have shown that flight distance can be influenced by temperature (e.g. Cooper 2003; Blamires 1999), distance to refuge (eg. Dill & Houtman 1989; Bonenfant & Kramer 1996), approach speed (e.g. Cooper 2003, 2005, 2006), sex (e.g. Guay *et al.* 2016), and body mass (e.g. Gotanda *et al.* 2009).

Flight distances in response to human approach have also been used by

wildlife managers to set guidelines for mitigating human disturbance on wild animals by setting buffer zones and maximum approach distances (e.g. Rodgers & Smith 1995; Giese 1998). Tourism has been shown to have negative effects on a range of taxa, for example, increasing offspring mortality (Müllner *et al.* 2004) and corticosteroid level (an indicator of physiological stress) (Ellenberg *et al.* 2007). Therefore it is important that evidence based recommendations for buffer zones are made in order to reduce such effects. Flight distances should be treated as a minimum for any recommendations as behaviour is likely to change well before this point. However, it provides a useful scientific justification for such guidelines.

I investigated the responses of Aldabra giant tortoises (*Aldabrachelys gigantea,* Schweigger 1812) to human approach. Tortoises are sedentary in nature, and their first response when threatened is not to flee. Tortoises are heavily armoured and their initial response to threat is to withdraw their head under their carapace. Therefore, in this study I measured not FD, but two parameters; (1) Alert Distance (AD), the distance at which the tortoise becomes alert to the approaching human, and (2) Head Withdrawal Distance (HWD), the distance at which the tortoise initiates the characteristic head withdrawal response. Measuring the AD is useful for setting guidelines about human approach, as it can be used as an indicator for the distance at which humans are detected by the tortoises and therefore their behaviour affected. Here it is assumed that the HWD is the point at which significant stress is experienced by the tortoise. There are currently no guidelines for human approach to Aldabra giant tortoises, despite significant tourism on many of the islands inhabited by free ranging tortoises.

As well as trying to establish approach distance guidelines, I also investigated whether responses to human approach varied with any environmental or individual variables. As large-bodied ectotherms, temperature affects many aspects of Aldabra giant tortoise behaviour (Swingland & Fraizer 1980) so it might be expected that ambient temperature affects their response to human approach. Research in other reptiles has given mixed results for the effects of temperature on FD, with some allowing closer approach when cooler (e.g. Blamires 1999) and others when warmer (e.g. Rocha & Bergalo 1990). However, as these reptiles rely on different anti-predator strategies (normally crypsis or flight) explanations relating temperature to FD in other reptiles are unlikely to be appropriate for tortoises. Mass may also affect the response to human approach as smaller tortoises are more vulnerable to predation (Arnold *et al.* 1979). The effect of sex on response was also investigated to see whether there was any difference between males, females and tortoises for which sex could not be identified in their response to human approach.

Methods

Study Site **-** Research was conducted between the 02/07/2018 and the 02/09/2018 on Fregate Island, Seychelles, between 1600 and 1800 hours. Fregate Island is one of the inner granitic islands of the Seychelles and has an area of 219 ha. It has the second largest population of free ranging Aldabra giant tortoises, after Aldabra atoll. Based on a recent census, the population on the island is estimated to be approximately 3,500 individuals (R. Baxter, pers. comm.). Fregate Island is privately owned and is currently managed primarily as a high end tourist resort and is permanently occupied by staff

and guests. Guests regularly touch and feed tortoises. However, only a small number of tortoises show any evidence of habituation to humans.

Approach Responses - Tortoises were selected for study at random when encountered in the field. Habituated tortoises which spontaneously approached humans or showed other evidence of habituation were omitted from the study. Tortoises were approached where there was a clear approach to the front of the tortoise and the line of sight from the tortoise to the experimenter was not obscured by vegetation. Tortoises were only approached when feeding, so that it was clear when the approacher had gained the attention of the tortoise. Tortoises were approached head on, at no more than a 45 degree angle to the direction they were facing. Tortoises were approached at a pace of ~75cm (one pace) per second. The distance from the experimenter′s chest to the tortoise's head was measured when: (a) the tortoise lifted its head up, looked at the experimenter and did not return to feeding (AD), and (b) when the tortoise initiated the characteristic head withdrawal response (HWD). I recorded curved carapace length (CCL), ambient temperature and sex for each tortoise. Tortoises were sexed based on size, plastron shape, carapace shape and tail length, according to recommendations by J. Gerlach ("Island Biodiversity", 2019). Smaller individuals, likely to be juveniles, who could not be easily sexed were put into a third category, sex unknown (U).

Tortoises were then individually marked using correction fluid with a two or three digit code to prevent pseudo-replication. Previous use of correction fluid to mark tortoises had shown that the markings can last more than 6 months (pers. obs.) and codes were re-applied when previously marked tortoises were encountered in the field. In total 75 tortoises were studied, 32 females, 31 males and 12 tortoises for which sex could not be determined.

Analysis - The data collected were analysed to establish whether there was any relationship between AD or HWD and sex, CCL and ambient temperature. A one-way ANOVA was used to see if there was any significant difference in AD or HWD between males, females and tortoises for which sex is unknown. The relationships between CCL and ambient temperature and AD and HWD were analysed using a linear regression analysis.

Results

Female CCL ranged in size from 74.8cm to 119.0cm. Male CCL ranged from 91.0cm to 172.0cm. Unsexed tortoises ranged in CCL from 12.2 to 73.0 cm. (Figure 1). There was no significant difference in either AD or HWD between males, females and tortoises for which sex was unknown (one-way Anova, $p=0.09$ and $p=0.38$ respectively, Figure 2). There was no significant relationship found between ambient temperature and AD or HWD (linear regression analysis, $p=0.07$ and $p=0.76$ respectively, Figure 2). There was no significant relationship found between CCL and HWD (Linear regression analysis, $p=0.10$, Figure 2). There was a significant relationship between CCL and AD (Linear regression analysis, $p=0.025$, Figure 2).

The distribution for AD and HWD for all tortoises approached is shown in Figure 3. The majority of tortoises had HWD of less than 5m (>97%). For AD, >97% of tortoises were undisturbed over 15m, >80% were undisturbed at 10m, and >42% of tortoises were undisturbed at 5m.

Discussion

Here, unlike in most studies assessing the response of an animal to human approach, flight distance (the distance at which an animal flees), is inappropriate. Therefore, I measured the distance at which the tortoise became alert (AD) and the distance at which the tortoise initiated its characteristic head withdrawal response (HWD) in order to assess the response of tortoises to human approach. There was no significant relationship between ambient temperature and either parameter measured. It may be likely that internal temperature has more of an effect on behaviour, as tortoise internal temperature has been shown to lag significantly behind ambient temperatures (Falcón *et al.* 2018). There was no significant difference found in either parameter between males, females and tortoises for which sex was unknown. This lack of difference between sexes was also found in a previous study in Galapagos giant tortoises (Hayes *et al.* 1988). Although there was no significant relationship between CCL and HWD, there was a significant positive relationship between CCL and AD. This seems odd as only smaller tortoises are vulnerable to predation (Arnold *et al.* 1979). This correlation could potentially be explained by smaller tortoises prioritising feeding over vigilance as they are undergoing more rapid relative growth. It may also simply relate to perception

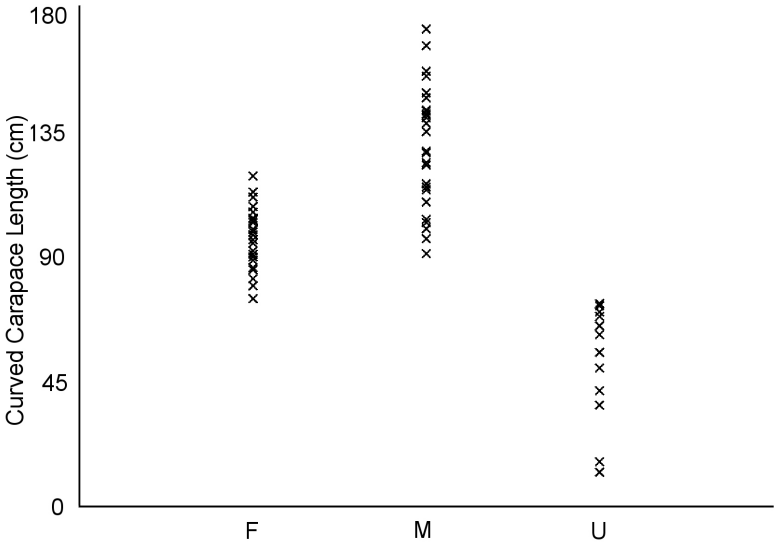

Figure 1: Curved carapace length (CCL) for female tortoises (F), male tortoises (M) and those of unknown sex (U)

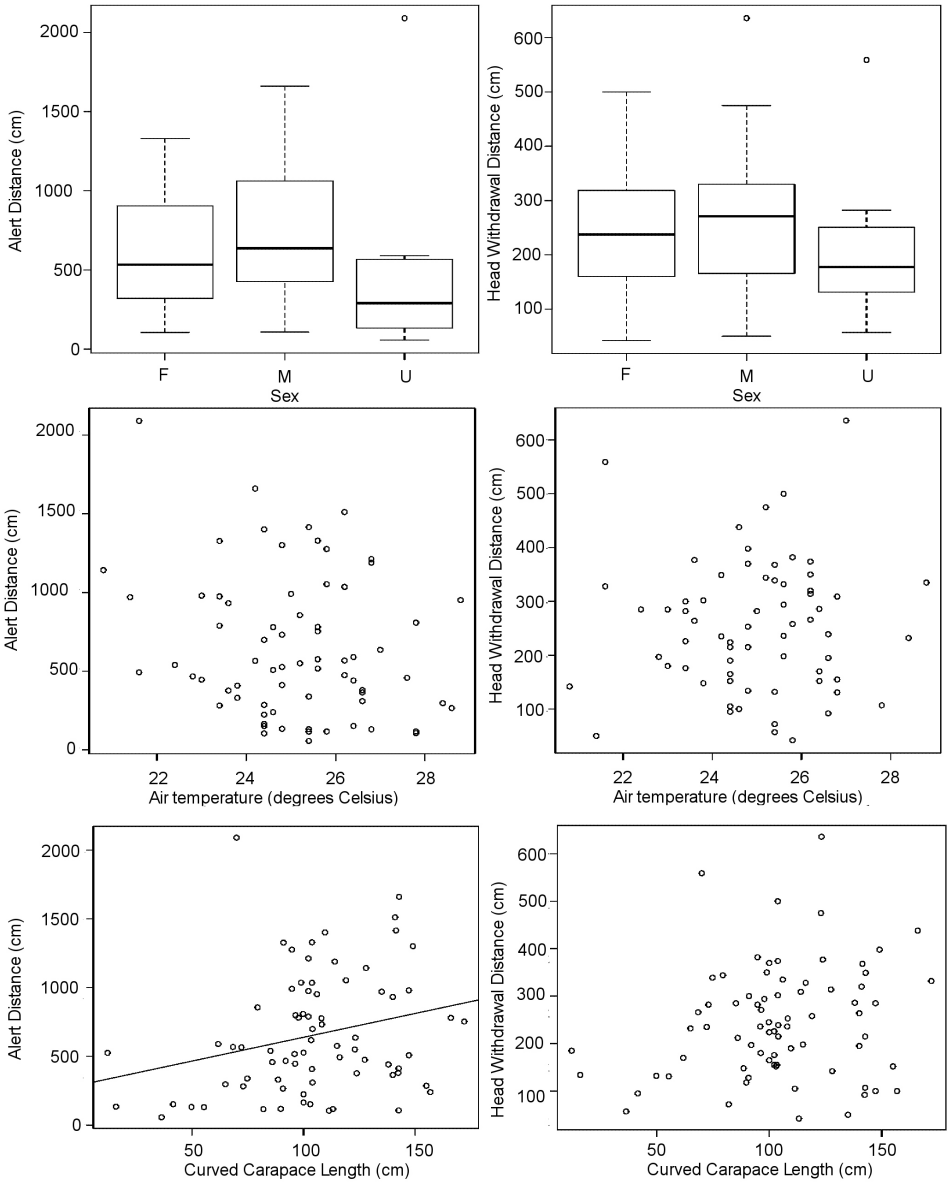

Figure 2: Graphs showing the relationship between Alert Distance (AD) and Head Withdrawal Distance (HWD) and sex, air temperature and Curved Carapace Length (CCL)

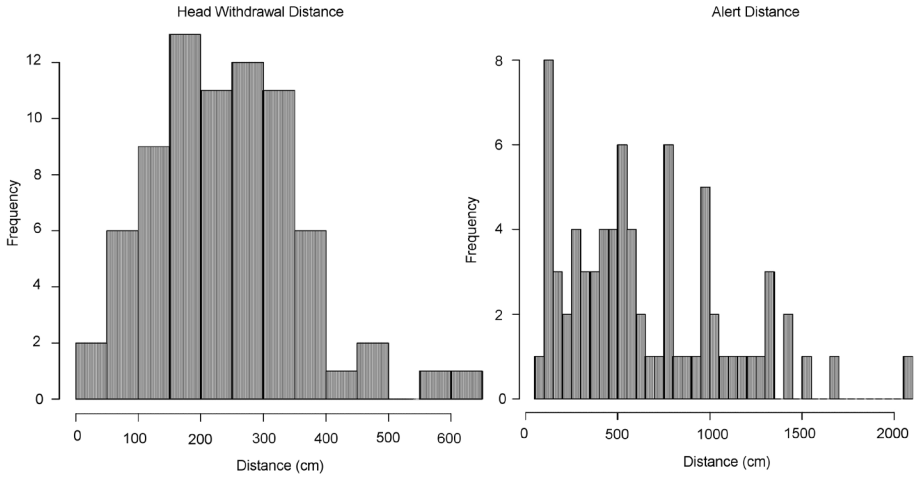

Figure 3: Histogram of Head Withdrawal Distances (HWD) and Alert Distances (AD) for Aldabra giant tortoises in response to human approach

ability, which could explain why head withdrawal distance is non-significant whereas alert distance is; smaller tortoises may be poorer at perceiving approaching threat, either due to lack of experience or differing fields of view. However, this result should be interpreted with caution, especially as there was no significant relationship between CCL and HWD. A previous study in Galapagos giant tortoises found no relationship between size and response to human approach (Hayes *et al*. 1988).

Although responses differed greatly between individuals, responses were broadly within the same range. Most of the parameters measured did not affect response to human approach, therefore it is reasonable to suggest that any guidelines generated from this data can be applied to all Aldabra giant tortoises. Based on these data I would recommend buffer zones of five meters as a minimum. Only two tortoises (less than three percent of the sample) showed a head withdrawal response at a greater distance. Furthermore, nearly half (>42%) of tortoises showed no awareness of humans at this distance. Tortoises that became alert at the largest distances probably became alert by senses other than sight, such as scent or ground vibrations, as tortoise eyesight is relatively poor (J. Gerlach, pers. comm.). Indeed scent may well play a significant role in the detection of human approach. However, this does not affect the validity of buffer zone recommendations based on these data. Buffer zones of five meters would avoid stress and significantly decrease any effects on behaviour.

Beyond causing stress, tourism has the potential to impact the behaviour of tortoises in other ways. This is important to consider where such changes in behaviour can affect the potential of the tortoises to act as agents of ecological restoration, widely used as the justification for their (re)introduction onto many Mascarene Islands (Griffiths *et al.* 2010; Gerlach *et al.* 2013). Tortoises regularly fed by humans may restrict their activity and dispersal to those areas where they are fed. This was observed with a few

individuals on Fregate Island, and although anecdotal, this does indicate that humans can change patterns of tortoise movement. If tortoises are encouraged to stay in one place this reduces their capacity to distribute native seeds, change vegetation structure through herbivory and act as disturbance agents. Even if feeding does not affect movement it may affect quantity or choice of vegetation consumed. Therefore, I would recommend that feeding is also discouraged and that further research is undertaken into the impacts of tourism on tortoises and their ability to act as agents of ecological restoration.

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Status update on Arnold´s giant tortoises *Aldabrachelys gigantea arnoldi* (Bour, 1982) at Silhouette, Seychelles

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Abstract: As with previous years, Silhouette island was visited in December 2018 in order to investigate both the adult free-ranging Arnold's giant tortoises *Aldabrachelys gigantea arnoldi* (Bour, 1984) at Grand Barbe and the four juveniles from that group. All adult found at Grand Barbe, including two male Arnold's tortoises were considered as healthy and in good condition. The four juveniles, which were found at Grand Barbe in 2017, were transferred to a newly built enclosure at the Hilton Labriz hotel and mixed with five older juveniles of the Aldabra giant tortoise *A. g. gigantea* (Schweigger, 1812). All four juveniles *A. g. arnoldi* grow well and thus are considered as healthy. In a few years, all nine juveniles are intended to be released at Grand Barbe, once they have reached an appropriate size and weight which prevents them from poaching. Nevertheless, the current co-culture of juveniles from both subspecies under natural outdoor conditions allows for a direct comparison of the morphological carapace differences, which are considered as distinct at this stage of development.

Introduction

Once established as a breeding group at the Nature Protection Trust of Seychelles (NPTS) on Silhouette island, the adult Arnold giant tortoises *Aldabrachelys gigantea arnoldi* (Bour, 1982) were transferred to Grand Barbe in 2007 (Gerlach 2003, Pawlowski & Krämer 2010, Wüthrich 2003). Grand Barbe was found suitable for an even a larger number of giant tortoises as the village at this site is almost abandoned and the access to this area is from both the land and sea is rather limited (Fig. 1). Aspects which are still considered relevant in order to prevent the tortoise from poaching. The

Fig. 1. Undisturbed bay of Grand Barbe.

adult group was considered as actively breeding at the time of its release into the wild and continuous monitoring during the following years indicated successful nesting at Grand Barbe, however no hatchlings or juveniles could have been detected (NPTS 2009, 2010). It took about ten years until the first offspring from *A. g. arnoldi* where discovered in the wild in 2017 (Pawlowski & Gerlach 2018). Once found, the four juveniles were transferred to a safe place at La Passe to remain there until they have reached an adequate size to be reintroduced at the area of Grand Barbe. In December 2018, Silhouette island was visited once again and the status of both adult and juvenile *A. g. arnoldi* was observed.

Status of adult tortoises at Grand Barbe

During the past eleven years, the total number of adult giant tortoises released to Grand Barbe is thought to have been ten: five of these are the *A. g. arnoldi* subspecies, whereas the other five belong to the Aldabran-form *A. g. gigantea*.

By the end of 2018, eight of them survived consisting of two males and six females. In fact, one male and one female died during the years before. The current subspecies status of the tortoise remaining at this site remains unclear, as not all of them have been found recently. The tortoises were numbered according to the date of their introduction at Grand Barbe; no. 1 to 5 refer to *A. g. arnoldi*, whereas no. 6 to 10 refer to *A. g. gigantea*. During the excursion to Grand Barbe in December 2018, two adult male Arnold's tortoises (i.e. "Hector" and "Stan") were found grazing at the urbanised grassland area of the former village at about 8:45 h (Fig. 2). A female Aldabra tortoise (no. 6), which had not been observed in previous years, was found seeking shelter from the sun in the denser vegetation area (Fig. 3).

Fig. 2. Adult male *A. g. arnoldi* grazing.

Fig. 3. Adult female *A. g. gigantea* in its shelter.

Fig. 4. Growing vegetation at Grand Barbe.

Both female *A. g. arnoldi* as well as the third male of the same subspecies ("Adrian"; presumably dead?) could not be found at this site in 2018. However, the overall low number of tortoises and thus the low pressure on the vegetation due to tortoise grazing and browsing resulted in a continuous increase and growth of the coastal vegetation, which made the location of adult tortoises in 2018 even more difficult than during the years before (Fig. 4). Taking this into account, finding juveniles or even hatchlings seems to be almost impossible and walking outside the grassland area may even result in serious damage of well camouflaged small tortoises due to unintended stepping on these small and soft-shelled animals.

Status of juvenile *A. g. arnoldi* at La Passe

By December 2018, the four juvenile *A. g. arnoldi* has been moved to the new outside enclosure, located within the Hilton Labriz area (Fig. 5). In addition to these four tortoises, five older and thus larger *A. g. gigantea* from an Aldabran breeding group on the outer Seychelles island of Desroches were kept in that enclosure (Fig. 6). The carapace length of the Arnold´s tortoises was estimated to be in the range of about 15 to 20 cm, whereas the Aldabran ones were considered to range from about 25 to 35 cm. Both subspecies are intended to grow up at this place until they have reached a sufficient size so that they all can be released at Grand Barbe in order to enlarge the already existing group of giant tortoises within the western side of the island.

Fig. 5. Enclosure for juvenile tortoises at Hilton, Labriz.

Fig. 6. Group of juveniles from *A. g. arnoldi* and *A. g. gigantea*.

The enclosure itself had both shady and sunny areas, as several large coconut trees provide sufficient shelter from the sun. Any growing coconuts were typically removed from the trees within the hotel area for precautionary reasons (i.e. injury of people due to fallen coconuts), which also includes the tortoise enclosure. The ground consists of sandy areas, but also of a small grassland area. Furthermore, a solid, concrete based shallow water pool was present, allowing the tortoises to regulate their water requirements and also to manage their body temperature during high daily temperatures. A wooden lockable cage was also present at one side of the area, in which the young tortoises were transferred during the night to protect them from poaching. The *A. g. arnoldi* were marked with a number on their carapace, whereas the *A. g. gigantea* had a combination of number and letter on their shell, so that both subspecies can be easily distinguished from each other. However, differences in sizes and markings were not the only difference, if the tortoises were observed more closely. In fact, the shape of the carapace differs significantly between both subspecies: it was much narrower for the *arnoldi* form, compared to the round shaped Aldabran form (frontal view; Fig. 7a, b). In addition, the juvenile *A. g. arnoldi* tortoises lacked the flattened shape of the back of the carapace (and angle of about 45 °) which is typical for *A. g. gigantea* tortoises (lateral view; Fig. 8a). Also, maximum carapace height in *A. g. arnoldi* juveniles was located more posteriorly than central, compared to the Aldabran form. Taking this into account, the carapace appeared somehow more elongated in *A. g. arnoldi* juveniles, compared to that of the *A. g. gigantea* juveniles (Fig. 9).

Fig. 7. Frontal view of *A. g. arnoldi* (left) and *A. g. gigantea* (right) juveniles.

Fig. 8. Lateral view of *A. g. arnoldi* (left) and *A. g. gigantea* (right) juveniles.

Fig. 9. Top view of *A. g. arnoldi* (left) and *A. g. gigantea* (right) juveniles.

The feed consists of various plants such as *Ipomea pes-caprae* and *Scaevola sericea*, *Artocarpus altilis* and grass, similar to the vegetation consumed by the adults at Grand Barbe (Fig. 10).

Discussion and conclusion

The current observations of adult and juvenile *A. g. arnoldi* revealed that all the tortoises found are in a good, healthy condition. The area at Grand Barbe still provides plentiful and varied feed, so that the adult tortoises within that area showed only little

movement. Especially, the two male Arnold tortoises were found closely to or directly on the grassland area of the old village, feeding on grass, old and fresh leaves and fruits from nearby breadfruit trees. In contrast, females were rather shy and were found mostly within the higher and more dense vegetation away from the grassland area. They may access the grass plain during grazing, but are considered to be more mobile than the males, which makes it difficult to find them during the daytime when they hide in the rather dense coastal vegetation and associated marshland (Pawlowski 2016).

Although juveniles were found in 2017 accidently, finding possible additional juveniles or even hatchlings in nowadays is considered highly unlikely, given the large number of possible shelters within the vegetation. Searching for adult tortoise outside of the grassland area may even lead to serious damage of young tortoises by accidental trampling, as they are well camouflaged in the dense vegetation.

Thus, the almost abandoned area at Grand Barbe can be considered as a suitable area for an independent living group of adult tortoises, although the mixing of two subspecies may not be considered appropriate. However, the large number (> 50) of old, corroded diesel barrels is a potential serious harm to the wildlife of this area due to the contamination of the associated marshland (fuel residues in the barrels) and the coral reefs in front of Grand Barbe. Furthermore, sharped-edged corrosive metal pieces from these barrels may also lead to serious injuries of adult tortoises if ingested along with the feed. The barrels once transferred to Grand Barbe (by boat) as energy supply for generators, where not shipped back to the main island, Mahé, but were dumped within the coastal forest and marshland area. In order to prevent this area from further

Fig. 10. Two juvenile *A. g. arnoldi* feeding on breadfruit.

contamination with carcinogenic diesel fuel, it is strongly recommended that these barrels are collected and removed from this area and recycled appropriately.

The new enclosure for the juvenile Arnold tortoises provides an excellent area for adequate growth under semi-controlled conditions, especially as poaching or damage due to rats can be almost excluded. However, given the current number of juvenile tortoises a further extension may become necessary due to the increased size of the juveniles. Although, the juvenile Arnold tortoises are currently kept together with slightly larger Aldabra tortoises, the co-culture allows for a direct comparison of the distinct morphological features of both subspecies, which are evident even at this stage of age development (see also Gerlach 2011). This comparison concluded that the four juveniles found at Grand Barbe in 2017 differ significantly from the Aldabra-juveniles and thus confirms them as offspring from Arnold tortoise breeding group.

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Pawlowski, S. & C. Krämer (2010): A visit at the NPTS tortoise and terrapin breeding station at Silhouette, Seychelles – *Radiata*, 19 (3): 12-21.

Wüthrich, F. (2003): Seychelles Giant Tortoise Conservation Project: Erste Nachzuchterfolge – *Testudo* (SIGS), 12 (1): 19-22.

Phelsuma **27** (2019); 18-35

New records of Gracillariidae (Lepidoptera) from the islands of Madagascar, Mauritius and Réunion

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Summary: 7 species of Gracillariidae (Lepidoptera) are recorded as new for the island of Réunion, one species new for Mauritius and two species for the island of Madagascar. Nine named species are illustrated by their imago, 15 images of genitalia preparations of 7 species are provided as well as the wing venations of 2 species. The larvae or mines are illustrated for 5 species.

Keywords: Lepidoptera, Gracillariidae, Madagascar, Mauritius, La Reunion, Malagasy region.

Introduction

Many families of micro-lepidoptera from tropical countries have only been studied occasionly. This is the case for the family of Gracillariidae in African countries, including the islands of the Indian Ocean. Only 280 species of Gracillariidae are known from the Afrotropical ecozone while 506 species are known from the Oriental region and 617 species from the Palearctic region (de Prins & de Prins, 2019). Many of the African species are only known from few or single records. In many cases there is no, or few, images available and even fewer have been illustrated by their genitalia. This renders their identification even more difficult. Little data on the biology or hostplants are known for most described African species.

This is also true for the species known from the Malagasy ecozone. Only 21 species had been described or reported from Madagascar, 6 species from Mauritius, 8 from La Réunion, none from the Comoros and 12 species are known from the Seychelles islands (de Prins & de Prins, 2019).

In this publication I illustrate nine species of Gracillariidae (Lepidoptera) that were collected during the past six years on the islands of Madagascar, Mauritius and Réunion. Two of these species are reported for the first time from Madagascar, one species that was collected for the first time in Mauritius as well as 7 species that are reported to occur in Réunion. Four of these species had been raised from larvae on their respective hostplants.

Collection sites

Réunion: Most specimens found in the island of Réunion were bred from larvae that were collected in the field. Most of them were found in La Possession along CD41, a mountain road that leads from sealevel to the neighbouring town of La Montagne (Saint-Denis). Larvae of a few species were also found in other localities that are indicated

in the text.
Specimens taken at light were mostly collected in La Possession, Ravine à Malheur in an altitude of 400 meters. Geographical coordinates: 20°55'37''S/55°21'45''E.
Other localities are indicated in the text.
Madagascar: Andasibe, 18°56'51''S/48°25'4''E, alt.945m, between 24.xi.-03.xii.2016.
Mauritius: Mahébourg (Tyvabro, Rue Marianne), 21°31'6''S/57°42'16''E, alt.15 m, 24.iv.2017.
I also prospected in Mauritius in June 2016 but did not spot any Gracillariidae in this period.

Methods

Some of the recorded species were taken at light. Though for many species these are only attracted occasionally and were mostly represented by single specimens.

In Réunion their larvae were also collected in nature on their respective hostplants. This method appears to be far more successful for obtaining larger series. Some species were found abundantly on their hostplants while they were only rarely or occasionly attracted by light.

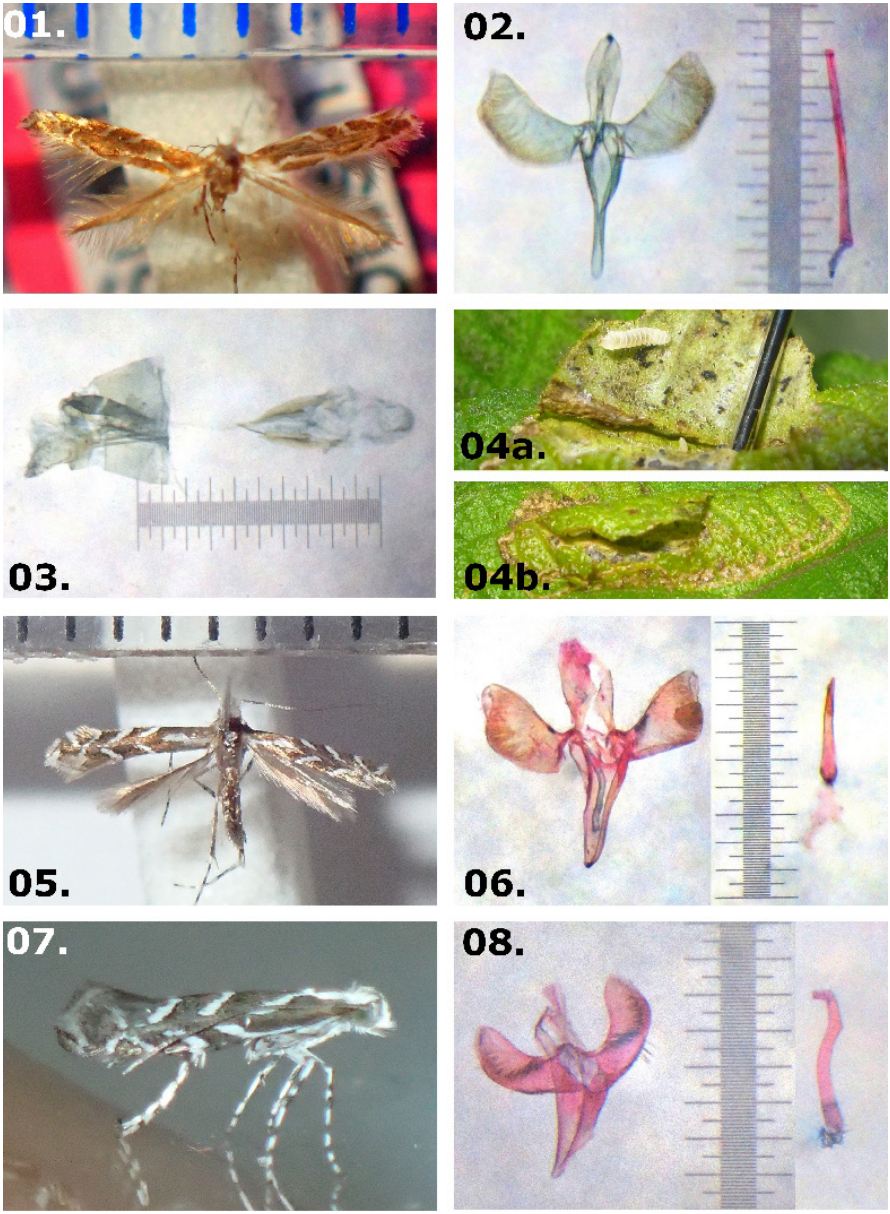
Genitalia preperations: I attribute a different prefix for my dissection slides corresponding to the country of collection followed by a number. For Madagascar I use the prefix: MG-, for specimens collected in Mauritius I use the prefix: MRU- and for Reunion the prefix: RE-.

Species of Gracillariidae:

Aristaea bathracma (Meyrick, 1912) – Figs. 1-3
Distribution: Afrotropical and Oriental regions
Afrotropical: Mozambique, South Africa, Uganda, recorded new for Madagascar and La Réunion.
Oriental: China, Japan, Russia (Far East), Thailand

Wingspan: 8-9mm.
Examined specimens:
One female (Fig. 1) in Sainte-Suzanne, Reunion, 17.xi.2015, gen.prep.RE-2366, one specimen in La Possession, 01.xii.2017.
1 female and 1 male in Andasibe, Madagascar, 25.xi-03.xii.2016.
Gen.prep. MG-031 (female; Fig. 3) and MG-600 (male; Fig. 2)

Hostplant: *Aster ageratoides* Turcz. (Asteraceae) in Japan (Kumata, 1977)
No hostplant is known from Madagascar and Reunion but *Aster ageratoides* seems to be unknown on these islands.



Figs. 1-3: *Aristaea bathracma* (Meyrick, 1912). Fig. 1: adult female, Réunion. Fig. 2: male genitalia, Madagascar. Fig. 3: female genitalia, Madagascar.

Fig. 4: Mines on *Lantana camara*

Figs. 5-7: *Aristaea onychota* (Meyrick, 1908). Fig. 5: adult male, Reunion. Fig. 6: male genitalia, Reunion (same as Fig. 5). Fig. 7: adult, in-situ

Fig. 8: *Aspilapteryx pentaplaca*, male genitalia, Mauritius

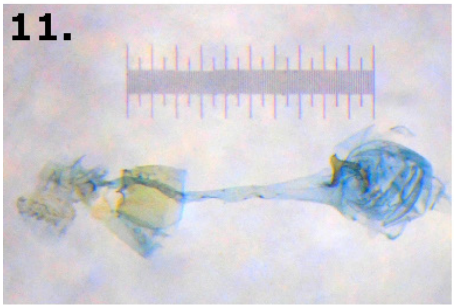
Aristaea onychota (Meyrick, 1908) – Figs. 5-7
Distribution: Nigeria (Bland, 1980), São Tomé (Type locality), South Africa, Botswana, Zimbabwe (Vári, 1961); recorded new for La Réunion.

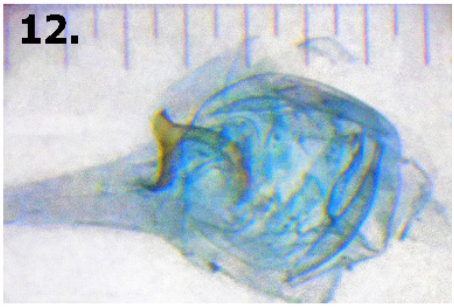
Wingspan: 8mm
Examined specimens:
One male (Figs. 5-7), 04.xi.2016, dissected, gen.prep. RE-2935 (Fig. 6), at light in Réunion, La Possession, alt. 400m.

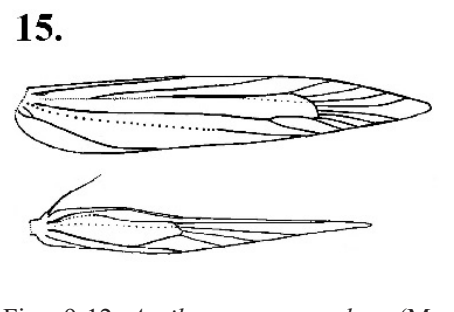
Hostplants: *Lantana camara* L.*, Lantana rugosa* Thunb., *Lippia asperifolia* Rich and *Lippia javanica* (Burm.) Spreng (Verbenaceae) had been recorded for this moth in continental Africa (de Prins & de Prins, 2019).
I did not identify its hostplant in La Réunion but I found a larva (Fig. 4) of an undetermined species of Gracillariidae on *Lantana camara* L. on 27.x.2015. No adult was bred successfully from this larva as it was paratized by an unidentified Ichneumonidae. I believe that this larva may belong to *Aristaea onychota* as it had been recorded as feeding on this plant by other authors.

Aspilapteryx pentaplaca (Meyrick 1911) – Figs. 8-12
Junior syonyme: ***Aspilapteryx filifera*** (Meyrick, 1912) TL: Mahé, Seychelles (Triberti, 1987)
Distribution: Seychelles, South Africa, Namibia, Nigeria (de Prins & de Prins, 2019). Type locality Pretoria, South Africa.. Recorded new for Mauritius and Réunion.

Wingspan: 6mm
The original description by Meyrick (1911), page 291 for *Aspilapteryx pentaplaca* reads as follows:
"6-7mm. Head white, Palpi white, second joint suffused with fuscous towards apex, terminal joint with dark fuscous median ring. Abdomen light grey, anal tuft ochreous-whitish. Forewings very narrow, elongate-lanceolate; brownish-ochreous, suffused with dark fuscous towards costa; a white dot on costa near base; five somewhat oblique shining white transverse fasciae edged with dark fuscous, second before, third beyond middle, forth sometimes interrupted beneath costa, last two sometimes narrow; a white mark across apex: cilia grey (imperfect). Hindwings rather dark grey; cilia whitish-grey".
Aspilapteryx filifera (Meyrick, 1912) had been treated as a junior synonyme of *A.pentaplaca* by Triberti (1987) though after de Prins & de Prins (2019) this synonymy had not been accepted by Vári.
The imago of *A.pentaplaca* from the Seychelles had been illustrated by Legrand (1966). Imago and genitalia of *A. filifera* from South Africa were illustrated by Vári (1961). De Prins & de Prins (2019) also illustrate a metallotype of this species from South Africa on their website.







Figs. 9-12: *Aspilapteryx pentaplaca* (Meyrick, 1911), Mauritius. Fig. 9: adult, in-situ. Fig. 10: adult. Fig. 11*:* female genitalia. Fig. 12: female genitalia, bursae

Figs. 13-16*: Callicercops triceros* (Meyrick, 1926). Fig. 13: adult, in-situ, e.l.*Bauhina monandra.* Fig. 14: adult, female, e.l.*Bauhina monandra.* Fig. 15: wing venations. Fig. 16: larva

The specimens collected in Mauritius and Reunion correpond in all points to the original description of Meyrick (1912) for *A.filifera* as well as to the imago illustrated by Legrand (1966) for this species. The male and female genitalia as well as the imago also correspond to those provided by Vári (1961) as *A.pentaplac*a of South African specimens.
I therefore follow Triberti (1987) and treat *A.filifera* (Meyrick, 1912) as being a junior synonym of *Aspilapteryx pentaplaca* (Meyrick, 1911).

Examined material:
Twenty specimens were collected in Mauritius, Mahéboug (Hotel Tyvabro) at light on 24.iv.2017. Two females and one male from Mauritius were dissected, gen.prep. Mru-108, Mru-109, Mru-110.
Two additional specimens were also found at light in Réunion, La Possession, 400m on 16.ii.2016 and 27.iii.2016.

Hostplant: unknown.
The collection site in Mauritius is situated in a residential area in the town of Mahébourg near a small river. It is likely that this species might be associated with an ornamental or agricultural garden plant. An aquatic plant may even be considered as being a possible hostplant, but these were absent from my collection site in Réunion.

One of the specimens collected in Mauritius was placed in the Musée d´Histoire Naturelle, Saint-Denis, Réunion in ix.2017.

Callicercops triceros (Meyrick, 1926) – Fig. 13-18
Distribution: Mauritius, Namibia, South Africa, Zambia, Zimbabwe, recorded new for Réunion.

Wingspan: 9-10mm.
A rather common species in Reunion where its hostplant, *Bauhinia monandra* Kurz has been widely planted as an ornamental plant along roadsides and in residential areas.

Biology: The larvae (Fig. 16) of *Callicercops tricers* have a lengths of 4-5mm and are cremish-beige with a blackish head. They form an irregular gallery mine on the leaves of its hostplant *Bauhinia monandra* Kurz. (Fabaceae). Mostly there are several mines on the same leaf. At maturity the larvae quit their mines and roll the edge of the leaf where they form a white cocoon.
Hostplant: *Bauhinia monandra* Kurz (Fabaceae).

Collection dates: raised from larvae (La Possession, alt. 90-270m) on 13.i.2015, 16.1.2015, 18.ii.2015, 20.ii.2015, 04.iv.2015, 06.iv.2015, 18.xi.2015, 27.xi.2015 and in iii. and ix.2016
2 specimens at light (alt. 400m) on: 23.xi-2013, 25.xii-2014

Months of the year: i, ii, iii, iv, ix, xi, xii.

Observations: I also found the leafs of Bauhinia monandra with gallery mines in other places near sealevel (St.Paul, Le Port). Similar *Bauhinia* sp. trees were also found in Mauritius, Blackriver, next to the river bridge and at Vanilla House Hotel in 2016 that showed the same kind of mines. I believe they may be *Bauhinia monandra* as well but as they did not carry flowers or fruits I prefer not to attribute them to a species name.
All *Bauhinia* species occuring in the Mascarene islands had been introduced by man and therefore also this moth is likely to be an introduced species in the islands of Mauritius and Réunion.

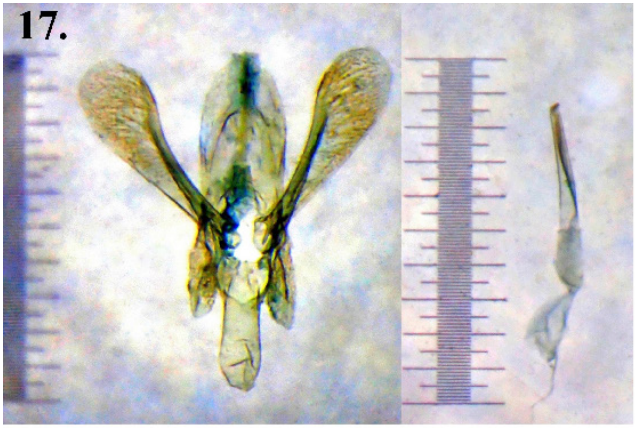
Additional note: Viette (1951b) described another species from Madagascar whose larva was reported from *Bauhinhia* sp.: *Callicercops milloti* (Viette, 1951b). He illustrated the male genitalia and a drawing of the forewing. In my opinion this species is a junior synonym of *Callicercops triceros* (Meyrick, 1926). I could not find any type material of this species. A photograph of *Callicercops milloti* Viette had recently been published by de Prins & de Prins (2019).
I wonder why Viette did not take reference to another synonyme o*f Callicercops triceros* whose holotype is found of the collections of the MNHN, Paris: *Callicercops triactis* (Meyrick, 1930). He had mentioned the type material from the MNHN collections only a few months later and designated a lectotype in another publication (Viette, 1951c). *Callicercops triactis* (Meyrick, 1930) was described from the neighboring island of Mauritius and is now considered being a junior synonym of *Callicercops triceros*.
Unfortunately I noticed that from some other publications of Viette, that he often did not take account of the species described earlier by Meyrick, including those of which his institute helds the type material described from Mauritius in 1930 and earlier. He seems to have described several other junior-synonyms particularly of species that were described by Meyrick.

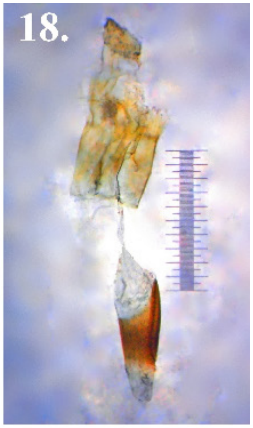
Additional note: Three of my specimens ex-larvae were donated to the Museum für Naturkunde, Berlin,, Germany and two specimens t to BMNH, London.

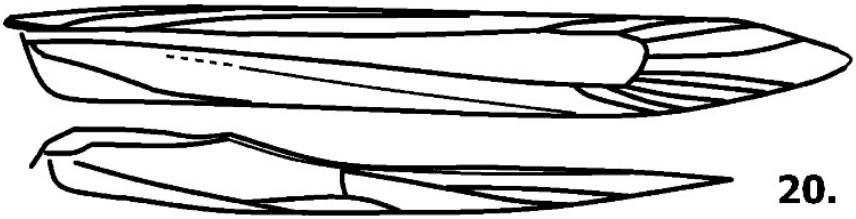
Macarostola eugeniella (Viette, 1951a)
Distribution: Madagascar (TL), Mauritius (Triberti, 1987) and Réunion

Wingspan: 9-10mm
I had repoirted this soecues earlier from Réunion (Bippus, 2016) but did not publish any images and collection data.

Hostplants: *Syzygium jambos* (L.) Alston and *Syzygium cumini* (L.) Skeels (Myrtaceae). Both hostplants are considered being introduced species to the Malagasy region.
Most of my specimens were reared from larvae on *Syzygium jambos* (L.) Alston (Myrtaceae) that I collected in altitudes between 500 and 550 metres in La Possession.

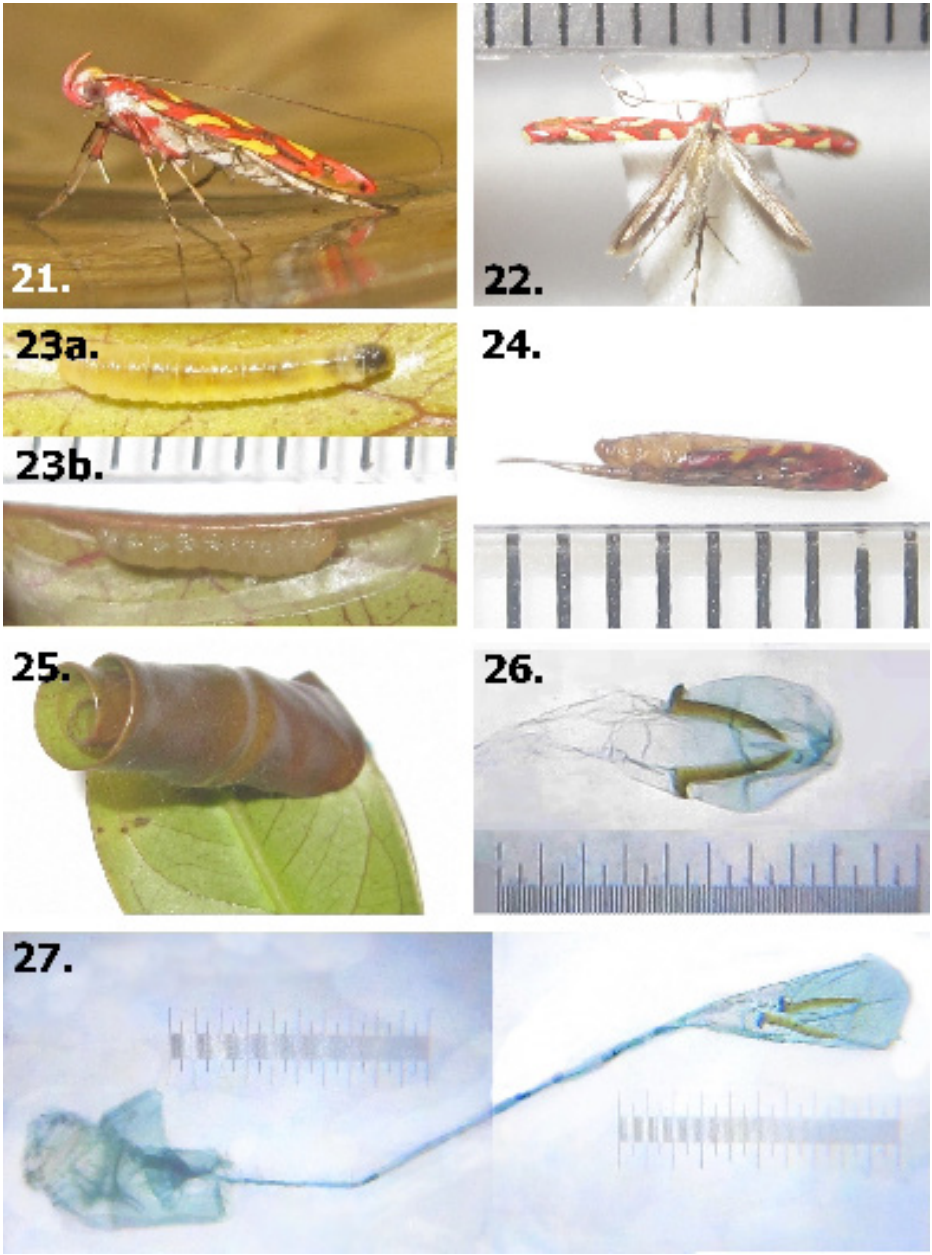






Figs. 17-18.: *Callicercops triceros.* Fig. 17: e.l., male genitalia. Fig. 18: e.l., female genitalia.

Figs. 19-20 *Macarostola eugeniella.* Fig. 19: e.l., male genitalia. Fig. 20: wing venations



Figs. 21-27: *Macarostola eugeniella.* Fig. 21: adult, in-situ, e.l.*Syzygium jambos*, 07.VIII.2015. Fig. 22: adult, e.l.*Syzygium jambos*, 24.ii.2015. Fig. 23: a) larvae, b) pupating larva on edge of the leaf. Fig. 24: larvae extracted from pupae. Fig. 25: rolled tip of *Syzygium jambos* leaf. Fig. 26: bursae. Fig. 27: female genitalia

Other sites of collection of larvae are Salazie (La Cayenne) and La Montagne, Réunion (alt. 700-750m)
It seems to be a common species on this plant and often I could collect more than 10 larvae along roadsides within a few minutes. Far more rarely it also feeds on *Syzygium cumini* (L.) Skeels on which I only collected two larvae in ix.2015. One specimen was also found at light in Sainte-Suzanne, Réunion, alt. 700m.
Its hostplants also grow in lower altitudes from sealevel to above 1000m altitude though I never found larvae below an altitude of 500 metres.
The young larvae forms a gall at the central vein of the young leaves of *Syzygium jambos* that are recognizable by their reddish colouration on their upper side. Mature larvae leave their galls and roll the tip of the leaf (Fig. 25) were they feed for a few more days. Often they also pupate inside this rolled tip but some of my raised specimens rolled the lateral edge of the leaf for pupation.
The larvae does not seem to feed on older leaves that show a dark greenish colouration on their upper side and a lighter greenish on their bottom side. Pupal stage: 12-14 days.

Months of the year: raised and recorded in the months of: ii, iv, vi, xiii, ix, x, xi, xii

Genitalia: the male genitalia (Fig. 19) and its valvae are very weakly sclerotized. The aedeagus is longer than the genitalia itself.
The female genitalia is weakly sclrotized, the ductus bursae is slim and filiform with a length of approx. 2.1/2-3 times the diameter of the bursae (Fig. 27). There are 2 hammer-like signa in the oval or drop-shaped bursae (Fig. 26).

Additional note: 3 specimens were donated to the Museum für Naturkunde, Berlin, Germany, 2 specimens to BMNH, London, and 5 specimens to Naturalis, Leiden, Netherlands. A single specimen was also desposited in the Natural History Museum of Port Louis, Mauritius and Saint-Denis, Réunion as well as to the Madagascar Biodiversity Center, Antananarivo, Madagascar.

Phyllonorycter lemarchandi (Viette, 1951a) – Fig. 42
Distribution: Madagascar (TL) and Réunion (new record)

Wingspan: 4.8mm.
Two male specimens were bred from larvae on 06.x.2015, La Possession, Ravine à Malheur, alt. 500m from *Sida rhombifolia* L. (Malvaceae).
I could not determine exactly the duration of its pupal stage but it must have been less than 16 days.
Additional larvae were collected on the same plant in xi.2015 but proved to be paratized.

Hostplant: *Sida rhombifolia* L. (Malvaceae).

Phodoryctis caerulea (Meyrick, 1912) – Figs. 28-35
Distribution: a widespread species; records in the Afrotropica region include: Cape Verde, Réunion, Uganda, West Africa (de Prins & de Prins, 2019); Mauritius (Mamet & Williams, 1993) and Madagascar; in the Oriental region recorded from India, Indonesia, Japan, Malaysia, Taiwan and from Oceania recorded in Fiji, Guam and Solomon islands.

Wingpsan: 6mm.
This is the most abundant species of Gracillariidae that I recorded from Réunion where I found its larvae (Figs. 31-33) on 7 different plants. I also found its larvae in Mauritius and Madagascar on two of the plants that I had recorded earlier in Réunion as being its hostplants.

Hostplants: De Prins & de Prins (2019) list more than 20 hostplant records for this species of Gracillariidae, mostly from Asia. Most records were made on Fabaceae species though they also list records on plants of the families of Apocynaceae, Caesalpiniaceae, Dioscoreaceae, Menispermaceae but note that some or all of the plants belonging to Menispermaceae, Dioscoraceae and Apocynaceae might have bene erroneously recorded.
Below I will only refer to the plants on which I found its larvae in Reunion, Madagascar or Mauritius. Most of these plants belong to the family of Fabaceae (six) and only one species belongs to the family of Plumbaginaceae: *Plumbago zeylanica* L.
Hostplants recorded in Mauritius: *Phaseolus lunatus* L., *Phaseolus vulgaris* L. (Mamet & Williams, 1993) and *Macroptilium atropurpureum* (DC.) Urb. (Fabaceae), vi.2016 in Flic-en-Flac; alt. estim. 10-15m (this publication).
Hostplants recorded in Réunion: Fabaceae: *Desmodium incanum* DC., *Desmodium intortum* (Mill.) Urb., *Lablab purpureus* (L.) Sweet, *Macroptilium atropurpureum* (DC.) Urb. (Fig.32), *Phaseolus lunatus* L. and *Phaseolus vulgaris* L. Plumbaginaceae: *Plumbago zeylanica* L
Hostplant recorded in Madagascar: *Desmodium incanum* DC. in Andasibe, place de la gare, 26.xi.2016.

Biology: In Reunion *Phodoryctis caerulea* (Meyrick, 1912) appears to feed most abundantly on *Desmodium intortum* (Mill.) Urb. and *Macroptilium atropurpureum* (DC.) Urb. (Fabaceae) (Fig. 32). These seem to be its principal hostplants on this island. Frequently I also found its larvae on *Desmodium incanum* DC.. Both *Desmodium* species are found mostly along roadsides or in other disturbed areas, often also on residencial grounds.
Macroptilium atropurpurem inhabits the same habitat but occurs in much larger stands in river beds near their mouth to the ocean. In some of these rivers (e.g. Rivière des Galets, Ravine à Marquet, Ravine des Lataniers and Ruisseau Noir, all located in La Possession) I find patches of 50-200m² entirely covered by this plant. On other sites, like roadsides, it is mostly limited to small patches of 2-5m² or single plants.
On these 3 plants it is rather frequent to collect more than 10 larvae on a few square metres of vegetaton. As *M. atropurpureum* is found in much larger stands, it might

be possible to collect even a few hundreds of larvae within an hour or two. Though I mostly restricted to a dozen or two collected on a few square metres on each site.
At one occassion I found its larvae also in a very important quantity on *Lablab purpureus* (L.) Sweet (Fabaceae) that was growing at the seashore near the entrance of the commercial harbour of Port-Ouest (Le Port, Réunion, 02.xii.2017). On a few dozens of leaves I had collected some two dozens of larvae but certainly there had been at least 3 times as many on a small surface of about 12-18m².
On *Phaseolus lunatus* L. (Lima beans, or locally called in French: Haricot du Cap or Pois du Cap) it appears to be a little less frequent than on the previously mentioned hostplants. Also on *Phaseolus vulgaris* L. (common bean; Fabaceae) I bred only 2 specimens in xii.2015. Apparently this moth is far less common on that plant. *Phaseolus vulgaris* grows permanently in my own garden but except for these two specimens I could never find any larvae on it again.
In Madagascar, Andasibe (place de la gare, alt.estim.945m, 26.xi.2016) I found its larvae also on *Desmodium incanum* DC.
In Mauritius I found its larvae to be common on *Macroptilium atropurpureum* (DC.) Urb. (Fabaceae) (Flic-en-Flac, alt.10-15m, 11.vi.2016). *P. caerulea* had been reported earlier from this island by Mamet & Williams (1993) to occur on *Phaseolus lunatus* L. and *Phaseolus vulgaris* L.

Larvae (Figs. 31-33):
In all Fabaceae species its larvae have a greyish-pinky to light reddish colouration (Figs. 31, 33). They can be easily spotted inside their mines (Fig. 32). Often I found 2-3 larvae in the same mine or leaf. At maturity they turn vivid red (Fig. 31) and quit their mines to build a whitish, oval cocoon (Fig. 33) of 5–6mm lenght that they mostly attached on a wall or the bottom of my larvae containers, though some cocoons were also attached to another leaf.
In contrast to the larvae collected on Fabaceae species, the larvae found on *Plumbago zeylanica* L (Plumbaginaceae, ii. and iv.2015) were light-greenish and also did not turn reddish at maturity. I therefore had some doubts if they really belong to the same species but could not state any differences in imago, size and male genitalia (Figs. 34-35). I believe that this difference in colouration of the larvae may be the result of some biological differnces of its hostplant compared to Fabaceae species.

Altitudes: I collected larvae from sea-level (0m) to 900m altitude (La Montagne, Colorado).

Collection dates: Recorded in the months of : iii, iv, v, vi, viii, ix, xi, xii
Specimens recorded at light in Réunion, La Possession, alt.400m on: 13.iv.2015, 11.viii.2015, 06.xi.2015, 04.iii.2016, 08.iii.2016, 06.iv.2016 and 26.iv.2016
Bred from *Desmodium intortum* or *Desmodium incanum* on: 20.iv.2015, 14.v.2015 (Colorado, alt. 900m), 29/30.xi.2015 (Colorado, alt.900m.

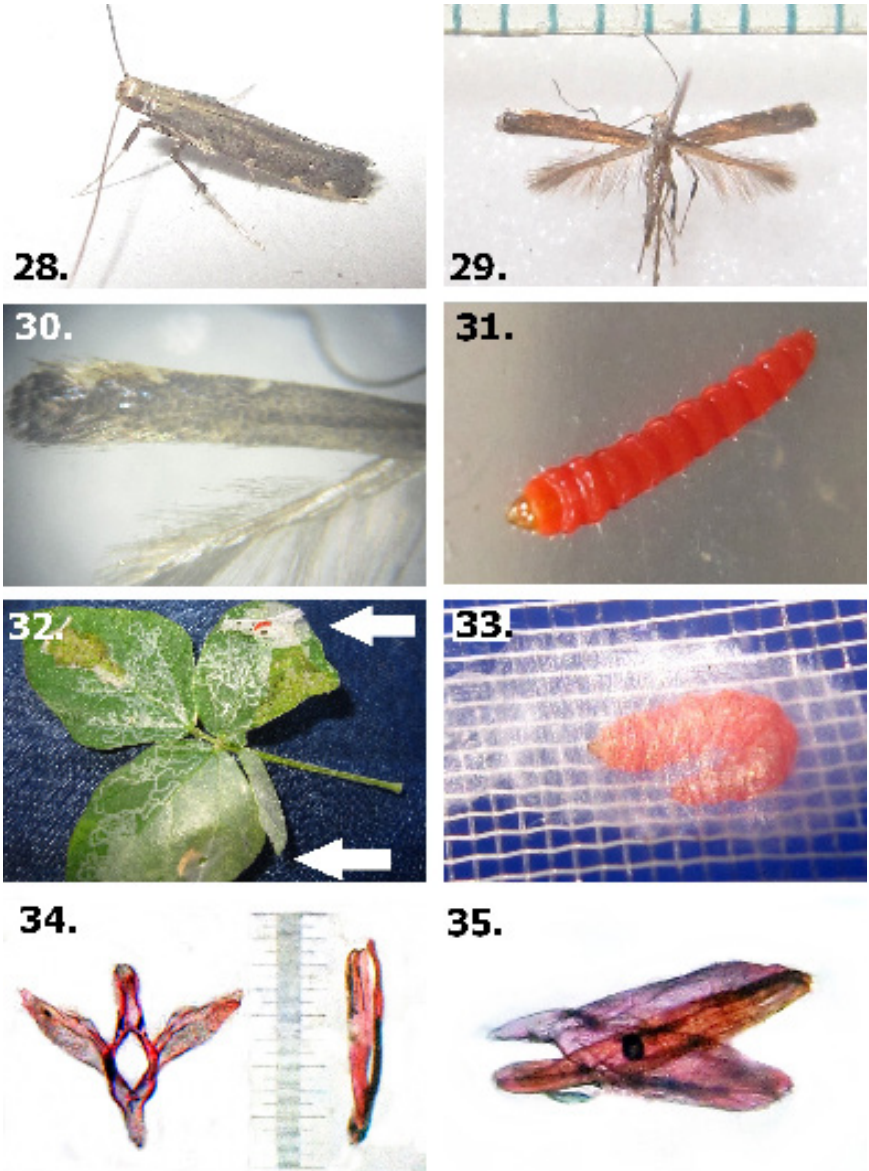


Plate 5: *Phodoryctis caerulea* (Meyrick, 1912) Wingspan: 6-6.5mm. Fig. 28: adult, e.l.*Macroptilium atropurpureum*, Réunion. Fig. 29: adult, wingspan: 6.5mm, e.l. *Desmodium incanum.* Fig. 30: left forewing, same specimen as Fig.29. Fig. 31: mature larvae, Réunion, on *Macroptilium atropurpureum.* Fig. 32: *Macroptilium atropurpureum* leaves with mine. Arrows: top: red larva on opened mine; bottom: pinkish larva in mine. Fig. 33: pupating larva. Fig. 34: male genitalia, aedeagus at right. Fig. 35: male genitalia, lateral view (unpressed, aed.in-situ)

Bred from *Macroptilium atropurpureum*: 23.x.2013, 05.xii.2014, 07.vi.2015, 18.vii.2015, 01.viii.2015, 10.ix.2015 and 19.xi.2015
Bred from *Phaseolus vulgaris*: xii.015 (2 specimens only) and from *Phaseolus lunatus* in iii.2016.

Additional note: 2 specimens ex-larvae were donated to the Museum für Naturkunde, Berlin, Germany and 14 specimens to Naturalis, Leiden, Netherlands (including dissection slides).

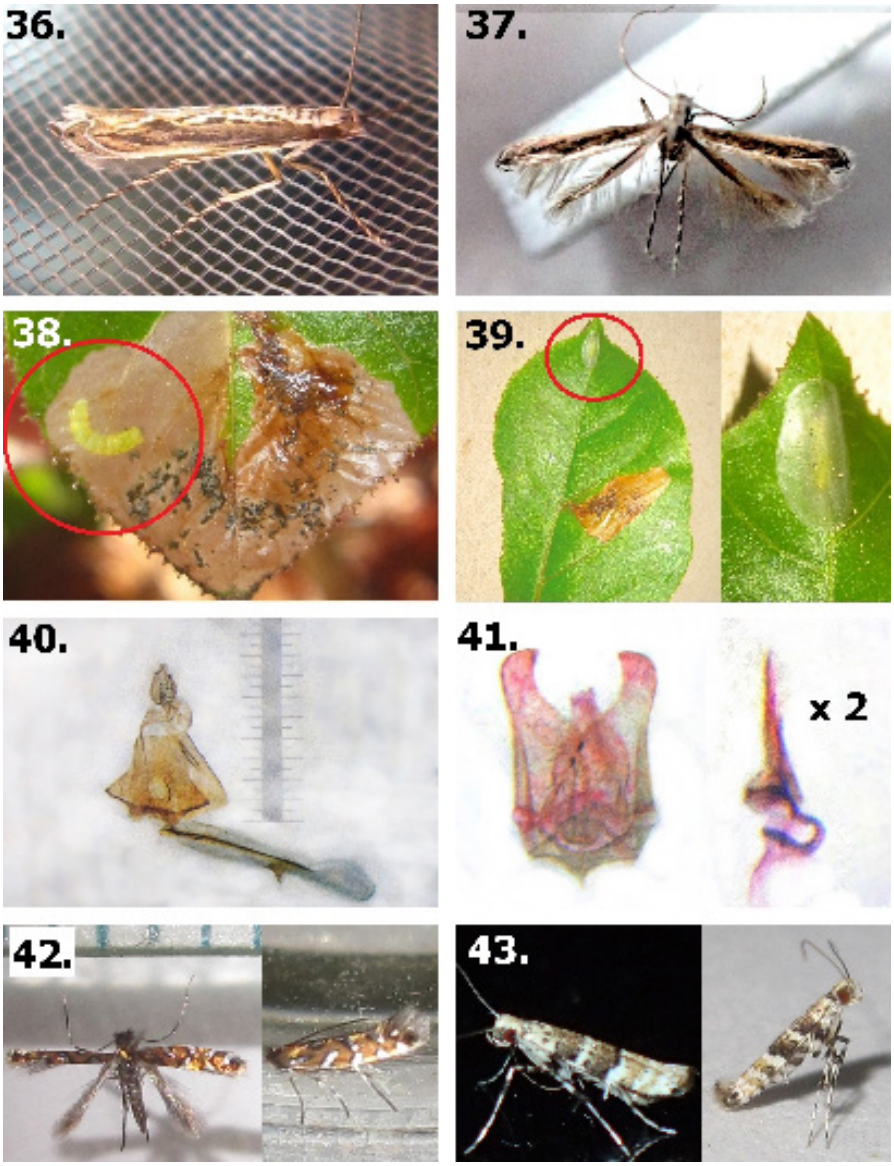
Stomphastis thraustica (Meyrick, 1908) – Figs. 36-41
Distribution: recorded from 13 Afrotropical countries, including Madagascar (de Prins & de Prins, 2019), as well as the Oriental region in China, India, Indonesia and Malaysia. Regionally found in Madagascar and Réunion (new record).

Wingspan: 9.0-9.5mm
This is a common species in Réunion that I raised from larvae collected on *Jatropha gossypiifolia* L. (Euphorbiaceae) in the months of ii, xi and xii.2014 and 30.x.2017 in La Possession (Petit Ruisseau, alt. 50m) but found its larvae also in other places in the same town near sea-level.
At light I collected additional specimens in Réunion, La Possession, alt. 400m on 10.ix.2015, 06.iv.2016, 26.iv.2016, 13.viii.2016, 17.xi.2017 and 01.vii.2018

Collection dates: recorded in the months of: ii, iv, vii, viii, ix, xi and xii.

Hostplants: *Jatropha gossypiifolia* L. (Euphorbiaceae) in Réunion and in India (Fletcher, 1921). In several other countries recorded on *Jatropha curcas* L (Euphorbiaceae) (de Prins & de Prins, 2019).This plant is also found in Reunion but was not be examined.
Vári (1961) also mentioned a record by Meyrick (1914) on *Microstachys chamaelea* (L.) Müll.Arg.(Euphorbiaceae) from India.

Biology: The larvae of *Stomphastis thraustica* are light greenish and form an irregular blotch mine on the leaves of its hostplant (Figs. 38-39).
Many leaves of its hostplant, *Jatropha gossypiifoli*a L only show a single larvae and blotch mine though in some cases I found up to 3 mines and larvae on a single leaf. The mature larvae quits its mine to form an oval cocoon (Fig. 39) on the same or a neighboring leaf. Some cocoons were found on leaves that did not show any blotch-mine but in these cases these were well present on a neighbouring leaf. The cocoons are oval and fairely transparent when new. They turn a little more opaque-whitish after a few days. The cocoons use to be placed near the edge of the leaf, mostly at the central vein at the tip of the leaf (Fig. 39). An estimated number of 75-80% of the coocons are placed on the upper side of the leaves but some can be found on the under side of the leaf as well.
One larvae was infested by an unidentified exo-parasite.



Figs. 36-41: *Stomphastis thraustica* (Meyrick, 1908). Wingspan: 8.5-9mm. Fig. 36: adult, female, Réunion, e.l.*Jatropha gossypiifolia.* Fig. 37: adult, female, Réunion, e.l. *Jatropha gossypiifolia.* Fig. 38: larvae & mine on *Jatropha gossypiifolia.* Fig. 39: mine & pupa o*n Jatropha gossypiifolia*

Figs. 40-41: *Stomphastis thraustica,* Fig. 40: female genitalia. Fig. 41: male genitalia. Aedaegus doubled in size.

Fig. 42: *Phyllonorycter lemarchandi* (Viette, 1951), e.*l.Sida rhombifolia*

Fig. 43: *Spulerina cf. hexalocha*, Réunion 21-xi-17 (left); 02.v.2014 (right)

Spulerina cf. hexalocha (Meyrick, 1912) – Fig. 43
TL: South Africa (Barberton), Sierra Leone (Bland, 1980), recorded new for Réunion

Wingspan: 7.5mm.
This species will need supplentary investigations.
The only specimen and holotype from South Africa (female, Barberton) has lost its abdomen (Vari, 1961). Vari only illustrated it wings. The image of the holotype was also recently published by de Prins & de Prins (2019).
In absence of genitalia images for *Spulerina hexalocha* my specimens cannot be compared in a satisfactory manner and this record will need further investigations.

Collection dates: 02.v.2014; 09.iv.2016 and 24.xi.2017, Reunion, La Possession, alt. 400m.

Hostplant: *Sclerocaya birrea* (A. Rich.) Hochst. (Anacardiaceae) for the South African holotype.
This species of plant had been introduced in Réunion and Mauritius but is rare and localized. I do not know if any trees are found in the sourroundings of the place of collection. No larvae of this species have been collected.

Distribution: South Africa (TL), Sierra Leone and Réunion

Acknowledgments

I would like to thank Dr.Paolo Triberti from Museo Civico di Storia Naturale, Verona, Italy and Mrs.Baryshnikova, Russia for providing to me several of their publications on this family.

In particular I am also grateful to Mrs. Jurate de Prins, Belgium (formerly at Africamuseum, Terveuren) for help, information, assistance, motivation and insistence. She not only identified my first specimen of *Phodoryctis caerulea* collected back in 2013 but she also pushed me to search for larvae and additional Gracillariidae species. This family was completely unknown to me when we got first into contact and I only started to search for larvae due to her insistence and it proved to be a very inspiring subject. Also her website www.gracillariidae.net was of big help in finding literature, references and images on this family.

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Table 1 – Checklist -by country: Gracillariidae recorded in the Malagasy region
In bold: species treated and illustrated in this publication

Réunion: 8 species + 7 new records *Acrocercops coffeifoliella* (Motschulsky, 1859) *Corythoxestis pentarcha* (Meyrick, 1922) *Dialectica anselmella* Guillermet, 2011 * *Dialectica geometra* (Meyrick, 1916) ***Macarostola eugeniella*** (Viette, 1951) ***Phodoryctis caerulea*** (Meyrick, 1912) *Phyllocnistis citrella* Stainton, 1856 *Phyllonorycter ruizivorus* De Prins, 2012 New records: ***Aristaea bathracma*** (Meyrick, 1912) ***Aristaea onychota*** (Meyrick, 1908) ***Aspilapteryx pentaplaca*** (Meyrick, 1911) ***Callicercops triceros*** (Meyrick, 1926) ***Phyllonorycter lemarchandi*** (Viette, 1951) ***Spulerina hexalocha*** (Meyrick, 1912) ***Stomphastis thraustica*** (Meyrick, 1908)	**Mauritius:** 6 species + 1 new record *Acrocercops macrochalca* Meyrick, 1910 ***Callicercops triceros*** (Meyrick, 1926) ***Macarostola eugeniella*** (Viette, 1951) ***Phodoryctis caerule****a* (Meyrick, 1912) ** *Phyllocnistis citrella* Stainton, 1856 *Phyllonorycter trochetellus* De Prins, 2012 New record: ***Aspilapteryx pentaplaca*** (Meyrick, 1911)
Madagascar.: 21 species + 2 new records *Acrocercops coffeifoliella* (Motschulsky, 1859) *Acrocercops guttiferella* (Viette, 1951) *Acrocercops hormista* Meyrick, 1916 *Acrocercops loxias* Meyrick, 1918 *Acrocercops theaeformisella* Viette, 1955 *Acrocercops tricyma* Meyrick, 1908 *Aristaea atrata* Triberti, 1985 *Callicercops milloti* (Viette, 1951) *Caloptilia infaceta* Triberti, 1987 *Caloptilia modica* Triberti, 1987 *Caloptilia scaenica* Triberti, 1987 ***Macarostola eugeniella*** (Viette, 1951) *Phyllocnistis saligna* (Zeller, 1839) ***Phyllonorycter lemarchandi*** (Viette, 1951) *Phyllonorycter madagascariensis* (Viette, 1949) *Stomphastis adesa* Triberti, 1988 *Stomphastis dodonaeae* Vári, 1961 *Stomphastis eugrapta* Vári, 1961 ***Stomphastis thraustica*** (Meyrick, 1908) *Telamoptilia cathedraea* (Meyrick, 1908) *Telamoptilia hemistacta* (Meyrick, 1924) New reocrds: ***Aristaea bathracma*** (Meyrick, 1912) ***Phodoryctis caerulea*** (Meyrick, 1912)	**Seychelles:** 12 species *Acrocercops angelica* Meyrick, 1919 *Acrocercops largoplaga* Legrand, 1966 *Acrocercops martaella* Legrand, 1966 *Acrocercops rhombocosma* Meyrick, 1911 ***Aspilapteryx pentaplaca*** (Meyrick, 1911) *Caloptilia megalaurata* Legrand, 1966 *Caloptilia prosticta* (Meyrick, 1909) *Caloptilia tirantella* Legrand, 1966 *Cryptolectica euryphanta* (Meyrick, 1911) *Cuphodes tridora* Meyrick, 1911 *Macarostola parolca* Meyrick, 1911 *Neolithocolletis pentadesma* (Meyrick, 1919) * = not listed by de Prins & de Prins (2019) ** =not listed by de Prins & de Prins,(2019) but recorded by Mamet & Williams (1993).

No Gracillariidae have been recorded in the Comoros and in Rodrigues.
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Phelsuma **27** (2019); 36-57

Pyraloidea of Mauritius and neighbouring islands (Lepidoptera)

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Summary: 31 species of Pyraloidea are reported from the island of Mauritius (11 species of Pyralidae and 20 species of Crambidae). In addition 9 additional species are treated that had been collected in the neighbouring islands, most had earlier also been recorded from Mauritius. 35 species and 28 genitalia preparations are illustrated on 11 plates. For 15 of these species there are new or recent hostplant records made and the larvae of seven species are illustrated.

Keywords: Lepidoptera, Pyraloidea, Crambidae, Pyralidae, Mauritius, Réunion, Madagascar, Malagasy region.

Introduction

At present only 64 species of Pyraloidea (Crambidae and Pyralidae) had been reported from the island of Mauritius. 53 of these species belong to the family of Crambidae. This is relatively few compared to the neighbouring island of La Réunion from where more than twice are many (109) species of this family are known to be found (de Prins & de Prins, 2019). Even larger is the proportion in the family of Pyralidae: 11 species are known from Mauritius while more than 3 times as many species (35) had been reported from the neighbouring island of Réunion. This large disproportion in numbers is certainly due to lack of research in Mauritius in recent years. Most of the more recent records have been added by general revisions of their genera, or from other countries and are found in rather scattered publications. The last author illustrating Pyraloidea from Mauritius was de Joannis (1932), and for some species it is even necessary to go back to Guenée (1862) or Boisduval (1833).

I would therefore like to make a short beginning to illustrate the Pyraloidea that I found during visits to Mauritius in 2016 and 2017. Some of these are well known species with a broad distribution but I believe it will be good to illustrate them at least once from this island. In a second part also some additional species will be illustrated although they were not found during these visits to in Mauritius. Most of them had been recorded in Mauritius by other authors and it may be helpful to illustrate them for future collectors.

16 of these species are reported for the first time to occur on Mauritius (7 Crambidae and 9 Pyralidae). 4 species are also identified for the first time from the neighbouring island of Réunion and one species from Madagascar. Some additional records for these species were made also on Mayotte by interested amateurs that are mentioned in the text. These were identified on their photographs and are limited to the more recognisable species of these families. New or recent faunistic data were collected for 15 of the species.

Methods

All the Lepidoptera collected in Mauritius were collected at light. Most of the mentioned species are also found on the neighbouring island of Réunion and I will add additional faunistic data also from this island. In Réunion I use to collect the larvae in the field and raise them to adult specimens. All data concerning new host plant records had been made in Réunion or are otherwise indicated.

Collection sites:

5 stations were visited in Mauritius in vi.2016 and one station in iv.2017:
- Blackriver (Vanilla House), alt. 20 m, 20°22’5”S/57°22’47”E, 06-10.vi.2016.
- Blackriver (station2), alt. 55 m, 20°21’31”S/57°24’27”E, 12.vi.2016.
- Bambous, alt. 230 m, 20°16’14”S/57°25’39”E, 11.vi.2016.
- Flic-en-Flac (Ave.Colombes & Aigrettes), alt.10 m , 20°16’57”S/ 57°22’16”E, 10-13.vi.2016.
- Mahébourg (Garden of the National History Museum), alt. 20 m, 20°24’59”S/57°42’12”E, 13.vii.2016.
- Mahébourg (Tyvabro, Rue Marianne), alt. 15 m, 21°31´6”S/57°42`16”E, 24.iv.2017.

One single species was recorded at an additional site in Souillac on 13.v.2017.

The Lepidoptera reported from Reunion were collected in La Possession, Ravine à Malheur at an altitude of 400 metres or the nearby surroundings. Geographical coordinates: 20°55’37’’S/55°21’45’’E.

A few of these species were also recorded in Madagascar or Mayotte and the localities are indicated in the text.

Genitalia preparations:
A short country code is added before the number of each genitalia preparation.
When numbers of genitalia preparation are indicated, the following prefix are used:
MRU- for specimens collected in Mauritius.
RE- for specimens collected in Réunion.

Distributional records:
For most species the distribution of these Lepidoptera are mostly limited to their regional distribution on the islands of the Western Indian Ocean. Species with a larger distribution in continental Africa or Asia are mostly shortened or limited to their ecozones as listed by de Prins & de Prins (2019) on their web-database www.afromoths.net.

Part A: Species of Pyraloidea recorded in Mauritius:

Pyralinae

Hypotia saramitoi (Guillermet, 1996) Figs. 1-2, 7.
Distribution: Réunion (TL) and new for Mauritius.
Wingspan: 21-22mm.
2 specimens were collected in Mauritius, one at each station, Blackriver (Vanilla House), 08.vi.2016 and Blackriver (stat.2) on 12.vi.2016 (Fig.01).

Hypsopygia mauritialis (Boisduval, 1833) - Figs. 3-4.
Regional distribution: Madagascar, Mauritius (TL), Réunion, Seychelles.
Wingspan: 17-18mm
One specimen was collected in Blackriver (Fig.3), 08.vi.2016 and 6 specimens in Mahébourg, 24.iv.2017 (Fig.4). Not otherwise examined.

Ocrasa nostralis (Guenée, 1854) - Figs.5-6, 8, 80.
Distribution: Brazil (TL), widespread in the Neotropical region up to southern USA, continental Africa, also recorded in Taiwan and more recently from continental Africa and Saint-Helena (Karisch, 2007).
Regionally known from Mauritius and Réunion (Bippus, 2018).
Wingspan: 22mm
One specimen was collected in Mauritius, Mahébourg, 24.iv.2017 (Fig.6).
In Réunion, La Possession, alt.400m this species was recorded on the dates: 22.ii.2013, 31.xii.2013, 16.ix.2014 (male, gen.prep.RE-1308, Fig.8), 20.x.2014, 25.xii.2014, 21.ii.2015, 10.v.2015, 01.vii.2015, 02.i.2016, 06.ii.2016, 30.viii.2016 (female, gen. prep. RE-2793, Fig.80), 24.ix,.2016, 26.xii.2016, 20.iii.2017 and 25.i.2018.
J. Armynot, Gendarme at the Gendarmerie Nationale of Saint-Louis bred this species from larvae that were hidden in a seized lot of *Cannabis sativ*a L. (Cannabaceae) in Réunion, Saint-Louis, 25.xi.2016.
Hostplant: *Cannabis sativa* L. (Cannabaceae)
Additional note: I had mentioned this species in an earlier publication on Erebidae (Bippus, 2018) but did not illustrate it. There seems to exist at present no publication with its genitalia images. The imago of this species had been earlier illustrated by Barnes & McDunnough, 1913 (as *Herculia sordalis*) from Florida and more recently by Karisch (2007) from Saint-Helena.

Chrysauginae

Parachma lequettealis Guillermet, 2011 - Figs.09-10; 81.
Distribution: Réunion (TL), Mauritius, Gabon, Nigeria, French Guyana and Peru (new records).
Wingspan: 17-25mm; females approx.24-25mm, males approx. 17-18mm
One female was collected in Bambous, 11.vi.2016. I also observed this species in Blackriver but did not collect the specimens.
There is an important difference in size between males and females. The females are much larger, measuring approx. 24-25mm of wingspan and the males only 17-18mm (Fig.09).
An unknown photographer from Mauritius had sent me his pictures of this species taken in Mahébourg already in 2013. Unfortunately we lost contact since.

Additional note: in 2012 I gave some specimens to an institute in Munich, Germany that meanwhile included their DNA at boldsystems and it was enclosed in the same cluster BOLD:AAU7990 as specimens collected in Gabon, Nigeria, French Guyana and Peru with an average distance of 0.39%: this species appears to be a recent introduction to the Mascarenes.

Phycitinae

Cadra cautella (Walker, 1863) - Figs.11-13; 82.
Distribution: a widespread pest-species of stored food products in the tropics, new records for Mayotte (B. Halliez) and Mauritius.
Wingspan: 13-15mm
This species is rather common in Réunion but also in Mauritius were I recorded several specimens in Blackriver, Flic-en-Flac and Mahébourg.
Astonishingly it had never been recorded from Mauritius, nor Mayotte where this species was also found by Benjamin Halliez in 2015.
D. Martiré (pers. comm. 2017) had raised this species also from larvae found in rice (*Oryza sativa* L.) that was purchased in a local supermarket (Réunion, vi.2016). I also found its larvae in the flowers of an ornamental plant: *Rhododendron simsii* Planch. (Ericaceae) (in Réunion, La Possession, alt.400m). I had noticed that this plant often shows some smaller holes in its flowers and also some chewing marks on the leaves next to the flowers. The larvae (Fig.12) were collected at daytime well hidden inside the flowers but I believe that they may quit their hide during the night-time to feed also on the leaves' upper surface.
2 females (Fig 11, wingspan 14,5mm, gen. prep. RE-1421, Fig.82) were bred 16 days after collection on 27.xi.2014 but I did not notice when they pupated.
Hostplant and substrates: *Rhododendron simsii* Planch (Ericacea) and stored food products, incl. rice (*Oryza sativa* L.).

Etiella zinckenella (Treitschke, 1832) - Fig.14.
Two specimen (Fig.14) in Flic-en-Flac, 10. and 11.vi.2016, not otherwise examined.

Hypargyria metalliferella Ragonot, 1888 - Figs. 15-18; 83.
Distribution: widespread in continental Africa, also recorded from India and Australia. New for Réunion and Mauritius.
Wingspan: 18-19mm.
One male was collected in Mauritius, gen. prep. Mru-144 (Figs.17-18). 2 females were also found in Réunion on 07.i.2015, gen. prep. RE-1459 (Figs.15-16; 83) and 11.ix.2018.
The proportion between ductus bursae and bursae is a little different to those illustrated by Balinsky (1991b). The ductus bursae appears to be a little longer and the bursae a little shorter. The imago and signa are identical and I believe that the proportion in this species is variable.

Morosaphycita morosalis (Saalmüller, 1880) - Figs.19-22; 79.
Distribution: Comoros (Mohéli & Mayotte), Madagascar (TL), Réunion and new for Mauritius.
Records from continental Africa and Asia on *Jatropha curcas* L. are misidentifications or doubtful.
Wingspan: 19.5-21mm
Two specimens were collected in Mauritius in Flic-en-Flac, 10.vi.2016 and Mahébourg, 13.vi.2016, gen. prep.Mru-132 (Figs.19; 79).
The aedeagus of the male genitalia (Fig.22) shows laterally a rather sclerified, triangular thorn (detail, Fig.22).
In Reunion I find this species frequently at light and also collected and bred its larvae (Fig.21) on its hostplant *Rhynchosia viscosa* (Fabaceae). Benjamin Halliez (pers. comm.) also found this species in Mayotte in x.2015.
Hostplant: *Rhynchosia viscosa* (Roth) DC (Fabaceae).
All records on *Jatropha curcas* L. are misidentifications of other Phycitinae species (see below).

Taxonomy of *Morosaphycita morosalis* (Saalmüller, 1880):
The identity of this species remained unclear for more than 100 years. It was not illustrated in the original publication by Saalmüller (1880), but a drawing was given by Ragonot (1893). His drawing is somewhat unclear and I think that an identification based on this drawing is uncertain.
Horak (1987) resolved the taxonomy of this species and transferred it to the newly described genus: *Morosaphycita* Horak, 1987. She published excellent images of the female genitalia of the holotype in the Senckenberg Museum,

Frankfurt and male genitalia from a series of specimens in the BMNH but did not show its imago as the holotype in Forschungsinstitut Senckenberg, Frankfurt could not be examined. She noted that Roesler (1983) had illustrated the female genitalia in an earlier publication that, unfortunately, is not available to me. Therefore I do not know if he also illustrated the imago in his publication.
Martiré & Rochat (2008) illustrated the imago of this species from Réunion in acceptable quality (in-situ), followed by Guillermet (2009) who illustrated a very small image of the imago but also adding genitalia drawings and wing venations, also from Réunion island. Their identifications are correct. Though I admit that these publications are not available on the internet and may be difficult to find in libraries abroad. Since 2012 there are also images of the imago of this species available in internet resources, including wikipedia.org.

Misidentifications on *Jatropha curcas* L. (Euphorbiaceae):
There was a real hype on studies on *Jatropha curcas* L. between 2003 and 2017 that seems to have led to a chain of misidentifications of this Lepidoptera as being a pest o*f Jatropha curcas*. They all seem to be misidentifications of other Phycitinae species. I could not really find out when and where it started (possibly around 2003 in studies from Egypt) but all subsequent studies naming this species from *Jatropha curcas* published or copied unverified information on the identity of the Lepidoptera involved. Some of these studies were illustrated (from India, Senegal and Madagascar), but even for these the quality of most images supplied is rather low, generally limited to unspread adult specimens or larvae. It seems that there are at least two different species of Phycitinae involved (probably three) but none of them is *Morosaphycita morosalis* (Saalmüller, 1880) or *Pempelia morosalis* as it was named in most of these studies. Another irritating factor in these studies is that many did not spell the author's name correctly, nor indicated the genus in which it had been transferred already in 1987, such as "Saalm Uller" instead of "Saalmüller", or incorrectly attributed the authorship to Fabricius (Fab.).
Only a single study from Madagascar by Raveloson (2009) not only illustrated the moth from spread specimens and in-situ, but also its head, antennae, legs, wing venation and male genitalia (photographs and line drawings). He preferred to leave the species unnamed as "*Phycitinae sp.*". I also do not recognize the species illustrated; it remains very difficult to name described species from Madagascar correctly as many have never been illustrated. The taxonomy of all other species of Phycitinae described from Madagascar between 1880 and 1907 that are housed in German museums (11 species) remains unclear. At the present rate of 100 years for a single species revision it will certainly take another 1000 years to resolve their taxonomy.

Phycita demidovi Guillermet, 2007 - Figs.25-27; 84.
Distribution: Réunion (TL) and new for Mauritius.
Wingspan: 18.5-21mm
This species showed to be the 2nd most common Phycitinae in Mauritius after *Cadra cautella*.
I collected 7 specimens in Mauritius, four in Bambous, 11.vi.2016, two in Flic-en-Flac, 10.vi.2016 and one specimen in Mahébourg, 13.vi.2016.
Two males collected from Bambous (gen. prep. Mru-130, wingspan 21mm (Fig.27)) and one female from Flic-en-Flac (gen.prep. Mru-139 Wingspan 18.5mm, Fig.84) had been dissected.
Also on Réunion (Figs.25-26) I find this species pretty often in low altitudes and it is one of the most abundant Phycitinae. I believe it may have a much larger distribution than presently known.

Pseudophycitatella leveuleuxi Guillermet, 2007 - Figs.23-24.
Distribution: Réunion (TL) and new for Mauritius.
Wingspan: 16-17mm
2 males were collected in Mauritius, Blackriver (Vanilla House) , 06.-10.vi.2016, gen.prep.Mru-105 (Fig.24).

Spatulipalpia pectinatella (de Joannis, 1915) - Figs.28-30.
Distribution: Mauritius (TL) and Réunion.
Forewing lengths: 10.5mm, Wingspan: 23mm.
Three male specimens were collected in Mauritius, Blackriver (Vanillla House) on 08. and 09.vi.2016 and Flic-en-Flac on 10.vi.2016 (Fig.30).
Hostplant: *Annona squamosa* L. (Annonaceae) (de Joannis, 1915).
Additional note: Williams & Mamet (1993) reported another species of Phycitinae from *Annona squamosa* from Mauritius: *Anonaepestis bengalella* Ragonot, 1894. All the records in their publication are a simple list, no dates or any

other details were stated and no images provided. I believe their record is a misidentification of *Spatulipalpia pectinatella* that is similar in size, colouration and pectinations of the antennae in the male but different in genitalia.

Species of Crambidae

Acentropinae

Eoophyla reunionalis (Viette, 1988) - not illustrated
I did not find this species during my stays in Mauritius but an unknown amateur photograph sent me images of it taken in Mahébourg, Mauritius in x.2013. This record therefore will need confirmation.

Parapoynx fluctuosalis (Zeller, 1852) - Figs. 31-34, 77.
Distribution: a very widespread species in continental Africa, southern Asia, southern Palearctic region to Japan, AustralasiThunbea and Pacific islands. Also recorded from Puerto Rico (de Prins & de Prins, 2019).
Regionally known from Comoros, Madagascar, Mauritius, Seychelles, recorded new in Réunion.
Wingspan: 19-21mm.
3 specimens were collected in Mauritius, Blackriver, stat.2 on 12.vi.2016. One female from Mauritius was dissected, gen. prep. Mru-136 (Fig.77).
This site of collection is situated next to an artificial water reservoir and an artificial irrigation channel.
I collected this species also in Madagascar, Andasibe, 24.xi.-03.xii.2016 were it was found to be a very common species. At least 4-5 specimens were present every evening. Near the collection site in Andasibe is situated a small lake.
One specimen was also collected in Sambava (Sava), garden of Hotel Mimi on 30.iv.2013. This collection site is also situated directly next to the Sambava river.
One single specimen (Fig.31, wingspan 20mm) was recorded in Réunion, La Possession, alt.400m on 13.iii.2014 and by Benjamin Halliez also recorded in Mayotte (Koungou, x.2015, pers. comm.).

Crambinae

Angustalius hapaliscus (Zeller, 1852) - Figs.35-36
Wingspan: 20-21mm.
A very common species in Mauritius, collected in Flic-en-Flac, Bambous (Figs.35-36) and Mahébourg, 13.vi.2016 and 24.iv.2017.

Chilo sacchariphagus (Bojer, 1856) - Fig.37
This species was another very common species in Mauritius and I recorded it in all visited sites.

Culladia achroellum (Mabille, 1900) - Fig.38
This species was found to be very common in Blackriver, 06-10.vi.2016 and in Mahébourg, 13.vi.2016 and 24.iv.2017.
Single specimens were also observed in Flic-en-Flac, 10-12.vi.2016. One female from Mahébourg, 24.iv.2017 was dissected, gen.prep.Mru-127.

Pyraustinae

Pyrausta pastrinalis (Guenée, 1862) - Figs.39-42
Distribution: Réunion (TL) and new for Mauritius.
One female (Fig.39) was collected in Mahébourg, 13.vi.2016, gen. prep. Mru-005 (Fig.42).
In Réunion I raised a male (Fig.40), gen. prep.RE-1944 (Fig.41) from larvae found on *Bidens pilosa* L. (Asteraceae) on 04.vii.2015. This plant has a large distribution and I believe that this Lepidoptera might also have a much larger distribution than presently known.
Hostplant: *Bidens pilosa* L. (Asteraceae).

Spilomelinae

Bocchoris inspersalis (Zeller, 1852) - Fig.45
One specimen in Mahébourg, 24.iv.2017. Not otherwise examined.
Occurs also on Mayotte (B.Halliez, pers.comm. 2015).

Bradina admixtalis (Walker, 1859) - Figs.43-44; 85.
Distribution: widespread in continental Africa and Australasia.
Regional distribution: Chagos, Comoros, Madagascar, Maldives, Réunion, new for Mauritius.
Wingspan: 25-27mm

3 specimens were collected in Mauritius. One male (Fig.44, gen. prep. Mru-080) and one female (Figs.43, 86. gen. prep. Mru-078) in Bambous, 11.vi.2016 and a second female in Blackriver, stat.2, 12.vi.2016.

Diaphania indica (Saunders, 1851) - Fig.46.
Regionally: Comoros, Maldives, Réunion, Madagascar, Mauritius.
One specimen in Mahébourg, 13.vi.2016. Not otherwise examined.

Filodes costivitralis Guenée, 1862 - Figs.47-48.
Distribution: widespread in Africa, regionally: Comoros, Mauritius, Madagascar and Réunion.
Two females in Mauritius, one at each station: Blackriver (Vanilla House; Fig.47), 06.-10.vi.2016 and Bambous, 11.vi.2016.
In Réunion its larvae is frequently found on *Thunbergia laevis* Nees. It appears to be an excellent defoliator of this plant that is considered in some countries as being invasive. The larvae (Fig.48) feed on the leaves' surface, often I find up to half of the leaves of a plant damaged over between 10 and 50% of their surface. I believe that this Lepidoptera might be interesting for studies as a biological control agent for countries where its hostplant causes problems.
Hostplant: *Thunbergia laevis* Nees (Acanthaceae).

Glyphodes mascarenalis de Joannis, 1906 - Fig.49
One specimen in Mahébourg, 24.iv.2017. Not otherwise examined.

Herpetogramma phaeopteralis (Guenée, 1854) - not illustrated.
One female (gen. prep. Mru-081) in Blackriver, stat.2 on 12.vi.2016.

Hydriris ornatalis (Duponchel, 1832) - Figs.51-52.
2 specimens in Mauritius, one at each station: Mahébourg, 24.iv.2017 and in Souillac, 13.v.2017.
I found its larvae (Fig.52b) on *Ipomoea indica (*Burm.f.) Merr. (Convolvulaceae) on 22.v.2014, Réunion, Etang-Salé (Etang du Gol), alt. 10-15m. The larvae cuts and folds the edge (Fig.52a) of a leaf where it hides and feeds inside.
Pupal stage: 15-16 days.
Hostplant: *Ipomoea indica (*Burm.f.) Merr. (Convolvulaceae).

Marasmia trapezalis (Guenée, 1854) - Figs. 53-54.
1 female (Fig.53) in Mauritius, Bambous, 11.vi.2016, gen.prep.Mru-082 (Fig.54).

Palpita vitrealis (Rossi, 1794) - Fig.50.
Forewing length: 13mm
One specimen in Flic-en-Flac (Fig.50), not otherwise examined.
One specimen was also reared from larvae found on *Olea lancea* Lam. on 14.i.2016 in Réunion, alt.1100m.
Hostplant: *Olea lancea* Lam. (Oleaceae).

Piletocera reunionalis Viette, 1957 - Figs.57-59; 86.
Distribution: Réunion (TL) and new for Mauritius.
Wingspan: 12-14mm.
8 specimens were collected in Mauritius, Blackriver (Vanilla House, Figs.59), Bambous, 11.vi.2016 and Mahébourg, 24.iv.2017 (Figs.57-58).

Piletocera viperalis (Guenée, 1862) – Figs.60-62, Fig.87.
Distribution: Réunion (TL) and new for Mauritius
Wingspan: 14-17mm
Two specimens were collected in Mauritius, Blackriver (Vanilla House, Fig.62), 08.vi.2016 and Mahébourg, 24.iv.2017.
Both species of *Piletocera* described from Réunion, *Piletocera reunionalis* Viette, 1957 a*nd Piletocera viperalis* (Guenée, 1862) were found also in Mauritius.
These species can be easily confused and are variable in their colouration. There are specimens with a more greyish colouration with brownish-blackish markings and also more yellowish specimens with brownish-blackish markings. The costa of the forewings of *Piletocera reunionials* is a little more curved with the apex a little more arched than in *P. viperalis* but they remain difficult to distinct. The smaller specimens belong mostly to *P. reunionalis* (12-15mm) and larger specimens to *P. viperalis* (14-17mm).

The main difference in the male genitalia between these two species is the prolongated vinculum o*f P. viperalis*. (Fig.60).
Additional note: Both species are no true *Piletocera* Lederer, 1863 but probably need to be transferred to another genus.

Sameodes cancellalis (Zeller, 1852) - Fig.55
Regional distribution: Chagos, Comoros, Madagascar, Réunion, recorded new for Mauritius.
One specimen in Mahébourg, 24.iv.2017.
Also recorded in Mayotte (Koungou, x.2015) by Benjamin Halliez.

Spoladea recurvalis (Fabricius, 1775) - not illustrated.
One specimen in Mahébourg, 13.vi.2016.
Also recorded in Mayotte (Koungou, x.2015) by Benjamin Halliez.
Hostplant: In Réunion its larva is commonly to be found on *Achyranthes aspera* L. (Amaranthaceae).

Synclera traducalis (Zeller, 1852) - Fig.56.
One specimen in Mahébourg, 24.iv.2017 (Fig.56). Not otherwise examined.
This species was also found in Madagascar, Mahamasina (Diana), 24.-26.iv.2013 and Andasibe, 29.xi.2016.
Also recorded in Mayotte (Koungou, x.2015) by Benjamin Halliez.

Part B: Species recorded on the neighbouring islands:

Eurrhyparodes tricoloralis (Zeller, 1852)- Fig.63-64.
Wingspan:17-18mm
The larvae of this species are found frequently on *Elephantopus mollis* Kunth (Asteraceae).
It forms a silky webbing (Fig.64) along the central vein of the leaf, sticks the opposite sides together and feeds inside.
Adults of this species were raised from larvae in the following months:
2014 : I, II, IV, V, XII ; 2016 : III (Réunion, La Montagne, alt.700m and La Possession, alt.500m)
Pupal stage: approx.10 days
Hostplant: *Elephantopus mollis* Kunth (Asteraceae).

Glyphodes stolalis Guenée, 1854 - Fig.65.
Distribution: a widespread species in continental Africa, Oriental region and Australia
Regional distribution: Comoros, Madagascar, Mauritius, Réunion.
I did not find this species during my stays in Mauritius but collected one specimen in Andasibe, Madagascar on 01.xii.2016 and frequently raised this species from larvae in Réunion, where it feeds on several *Ficus* spp.. The larvae use to roll a leaf in cigar-shaped form and feeds and pupates inside. Very frequently the larvae can be found on *F. rubra* and *F. mauritiana*, and a little less frequently also on *F. reflexa*. *F. pumila* also belongs to its hostplants but as its leaves are smaller and harder they appear to be more difficult to roll and I only found 2 specimens on this plant. Martiré & Rochat (2008) also reported this species on *F. carica* (Réunion) and Mamet & Williams (1993) on *F. benghalensis* from Mauritius.
Hostplants: *Ficus mauritiana* Lam, *F. rubra* Vahl, *F. reflexa* Thnbg., *F. carica* L., *F. pumila* L., on Mauritius also recorded on *F. benghalensis* L. (Mamet & Williams, 1993).
Additional note:
Viette, 1987 described this species as *Glyphodes shafferorum* Viette, 1987 from the islands of the Malagasy subregion, basing on an error in the drawing that he stated in the original publication of Guenée. Though Viette did not clear the taxonomy of *Glyphodes stolalis* Gueneé, 1854; he did not state where it lives, if it ever existed or if it was just a phantom or fantasy species of Guénée. He also did not seem to have checked whether the other museums had any specimens available from other regions. His description was based on the error in the illustration by Guénée, 1854 and the supposition that the holotype no longer existed. Many historic drawings contain similar errors, as do some of the descriptions made by Viette (Bippus, 2017).
Glyphodes stolalis is a widespread species. Nowadays there are many images available, from all 3 continents from where it is known: Africa, southern Asia and Australia. There is no difference between my Réunion and Madagascar specimens and these images. De Prins & de Prins (2019) also illustrate on their website the holotype of another junior-synonym of *Glyphodes stolalis* that is housed in the Naturalis Biodiversity Centre, Leiden, Netherlands: *Glyphodes substolalis* Snellen, 1899. Furthermore Park *et al*. (2016) published its male genitalia from Laos.

Therefore I will simply consider *Glyphodes shafferorum* Viette, 1987 as being another junior synonym of *Glyphodes stolalis* Guénée, 1854.
In 2016 I added 16 specimens collected in Réunion (mostly ex-larvae) to the collections of Naturalis, Leiden, Netherlands.

Herpetogramma minoralis (Warren, 1892) - Figs.66-68.
Distribution: Ghana (TL), Nigeria, Madagascar, Mauritius, Réunion, Seychelles.
Wingspan : 20-21mm.
I bred this species from larvae found on an unidentified *Begonia* sp. in Réunion, 29.viii.2013. Its larva is greenish with a blackish head and turns pinky reddish at maturity (Fig.66). The plant was purchased in a local nursery and is likely to be an introduced or hybrid species.
Hostplant: *Begonia* sp. (Begoniaceae).

Mabra eryxalis (Walker, 1859) - Figs.69-70.
Distribution: widespread in Asia, records include India, Indonesia (Sumatra), Malaysia, Myanmar, Sri Lanka (de Prins & de Prins, 2019) but also reported from Australia, Bhutan, Taiwan, Thailand.
Regional distribution: Chagos and recorded new for Mayotte and Réunion.
Wingspan: 14-15mm.
This tiny Pyraustinae was first illustrated from Réunion as an unidentified species by Martiré & Rochat (2008), page 273 as "*Espèce indéterminée 4*" and could now finally be identified.
It seems to be rare and is only known from two sightings in Réunion: St. Philippe, 29.iv.2004 and St. Benoit, 28.v.2005 (pers. comm. J. Rochat & D. Martiré, 2019). V. Nicolas (comm. pers. 2018) also found this species in Mayotte in the first quarter of 2018.
Hostplant: in Asia this species is known to feed on rice (*Oryza sativa* L.) (Khan, Z.H. 2000). Rice was cultivated in Réunion during the age of slavery but was ceased in the mid 19th century.

Notarcha quaternalis (Zeller, 1852) - Fig.71.
Distribution : Widespread in continental Africa, Australia, India and Iran (de Prins & de Prins, 2019).
Regionally: Comoros, Madagascar, Mauritius and Réunion.
In Réunion I raised this species from *Sida rhombifolia* L. (Malavaceae) and from *Bidens pilosa* L. (Asteraceae), 09.vii.2015.
My record on *Bidens pilosa* is the first record on an Asteraceae for this Lepidoptera and I remember that also some *Sida rhombifolia* plants were growing nearby. Several damaged leaves were found on *Bidens pilosa* but only one of them was opened to check if there is a caterpillar inside. I can therefore not really exclude that the larvae fed on a nearby plant and only attached the pupae on *Bidens Pilosa*; this record on this plant will need reconfirmation.
Hostplant: *Bidens pilosa* L. (Asteraceae) and *Sida rhombifolia* L. (Malvaceae).

Patania balteata (Fabricius, 1798) - not illustrated
Distribution: found throughout continental Africa, southern palearctic region from the Mediterranean region to China, Japan and Papua New Guinea.
This is a rather common species in Réunion where it seem to be the main defoliator of *Searsia longipes* (Engl.) Moffett together with the Gracillariidae: *Caloptilia xanthochiria* Vári, 1961.
Its larvae forms a triangular fold of the leaf and feeds inside.
The hostplant record of Guillermet (2009) for Réunion for *Rhus cotinus* (junior synonym of *Cotinus coggygria* Scop.) must be a misidentification or was copied from the publications of other authors. This plant does not grow in Réunion and it is found in the Palaearctic region, around the Mediterranean basin to China.
Hostplant: *Searsia longipes* (Engl.) Moffett (Anacardiaceae).
Parasites: Two specimens of *Diolcogaster curticornis* (Granger, 1949) (Braconidae) were raised from its larvae on 16.viii.2015 (Identification: Pascal Rousse, France).

Orphanostigma abruptalis (Walker, 1859) Figs.72-73, 76.
Distribution: widespread in continental Africa, southern Asia, Australia and Pacific regions.
Regionally found in the Comoros, Mauritius, Réunion, Seychelles.
Wingspan: approx.20mm.
The adult moths are very similar to those of *Salbia haemorrhoidalis* Guenée, 1854 (Fig.84) that is also present on both main islands of the Mascarenes: Réunion and Mauritius. The forewings only show an small difference in the incurvation

of the brownish outer line at 3/4 of the forewing. This line shows a little misalignment at 1/3 from costa in *O. abruptalis* but is more rounded in *S. haemorrhoidalis* (Fig.74).
In Réunion, La Possession, alt.400m I collected its larvae in vii.2013 on *Ocimum basilicum* L. (Lamiaceae) = basil, from which were bred two adults on 05.viii.2013.
In India recorded on *Mentha spicata* L. (as *Mentha viridis* L.) (Lamiaceae) (Abul Kareem et al, 1960).
Hostplants: *Ocimum basilicum* L.; in India on *Mentha spicata* L. (Lamiaceae).
Genitalia: the male (Fig.72) has some recognizable projections on the upper and lower inner sides of the valvae. The bursae of the female genitalia shows a small signum (fig.76, detail: increased x 3-times).
Additional note: Guillermet (2009) seems to have confused the female of this species with *Salbia haemorrhoidalis* Guenée. His illustrations for the female genitalia of *O. abruptalis* seem to correspond to a specimen of *S. haemarroidalis* in shape, and is also lacking the signum.

Salbia haemorrhoidalis Guenée, 1854 - Figs.74-75
Distribution: Neotropical, introduced as biological agent in Australia, Hawaii and Mauritius, recorded new for Réunion.
This species had been introduced to Mauritius in 1965 (Fowler *et al*., 2000) but has also reached the neighbouring island of Réunion in a natural way. In vi.2015 I collected its caterpillar (Fig.75) on *Lantana camara* L. in La Possession, alt.550m. An adult moth (Fig.74) emerged from this larva on 15.vii.2015.
Hostplant: *Lantana camara* L (Verbenaceae).

Palpita metallata (Fabricius, 1781) - Fig.78.
Distribution: widespread in continental Africa, including Comoros, new for Madagascar.
Wingspan: 35-37mm
This species is one of the most common species of Spilomelinae found in Madagascar, Andasibe, 24.xi.-03.xii.2016 but astonishingly had never been reported from this country. It is certainly just an omission former researchers as I found specimens collected in the 1960s and 1970s in the collection of Madagascar Biodiversity Centre, Antananarivo that had been duly identified.
This species is absent from the Mascarene islands.

Zebronia phenice (Cramer, 1782) - not illustrated
Distribution: throughout tropical Africa, regionally known from Comoros, Madagascar, Mauritius, Réunion (de Prins & de Prins, 2019) and Seychelles (Bippus, 2016).
The type locality of this species is giving some confusion. Cramer indicated in the original description (in French): "*Sa demeure est Suriname*", translated literally "*It belongs to Suriname*" and generally it is thought that he meant the South American country of Suriname and that the type locality was therefore erroneously reported. It seems to be unknown among European entomologists that there is also a town called Suriname in the southern part of the island of Mauritius. I believe that the holotype possibly was collected in Mauritius and was labelled by its town and not the country when received by Cramer. Cramer must have had some contacts to a Mauritian collector. In the same series of publication he described another species as having been found on this island: *Amerila vidua* (Cramer, 1780).

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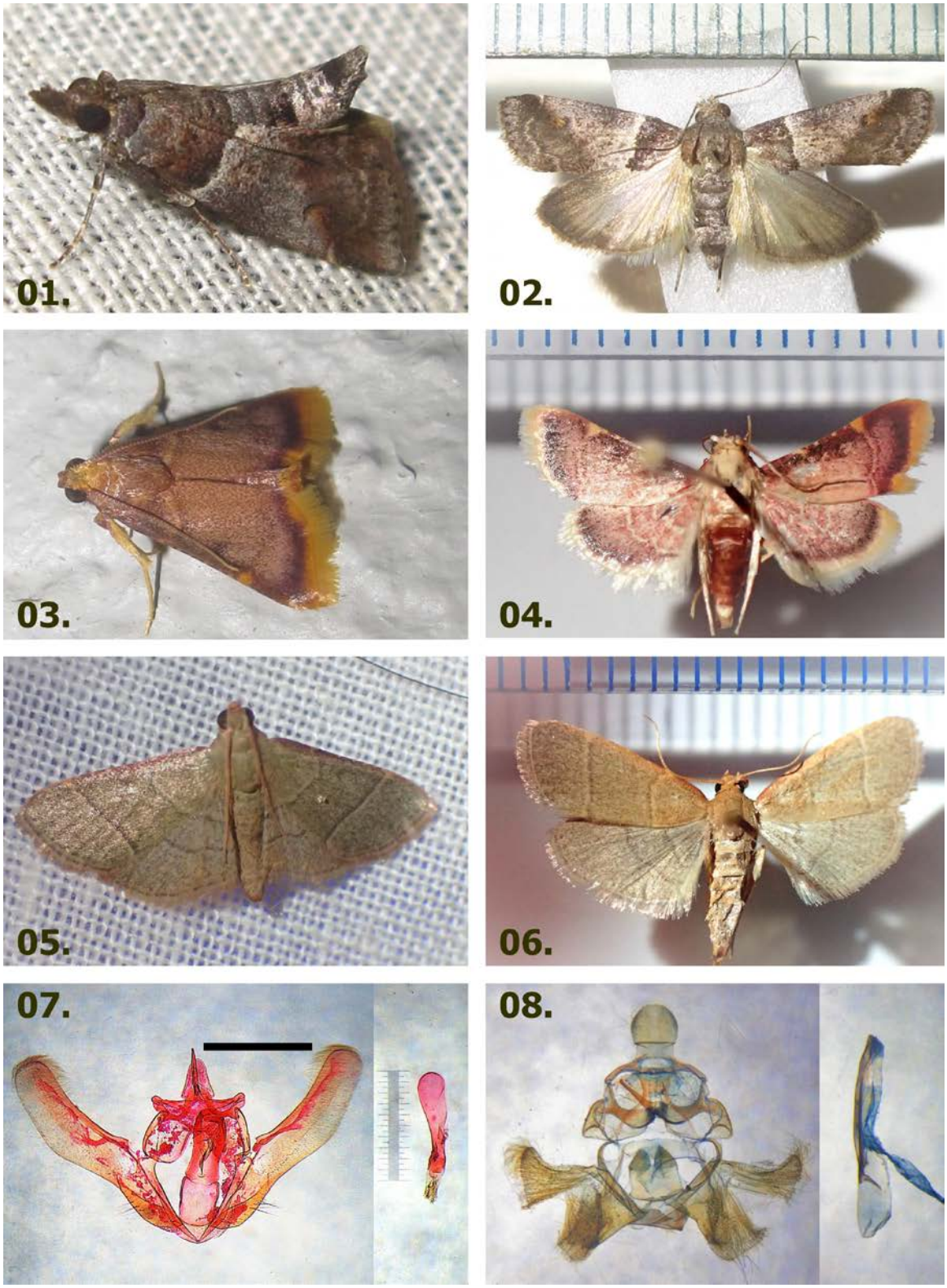

Plate 01:
Fig.01 - *Hypotia saramitoi*, Blackriver
Fig.02 - *Hypotia saramitoi*, wingspan 21mm
Fig.03 - *Hypsopygia mauritialis*, Blackriver
Fig.04 - *Hypsopygia mauritialis*, Mahébourg, ws: 17mm
Fig.05 - *Ocrasa nostralis*, Mahébourg
Fig.06 - *Ocrasa nostralis*, Réunion, ws: 22mm
Fig.07 - *Hypotia saramitoi*, male genitalia
Fig.08 - *Ocrasa nostralis*, male genitalia

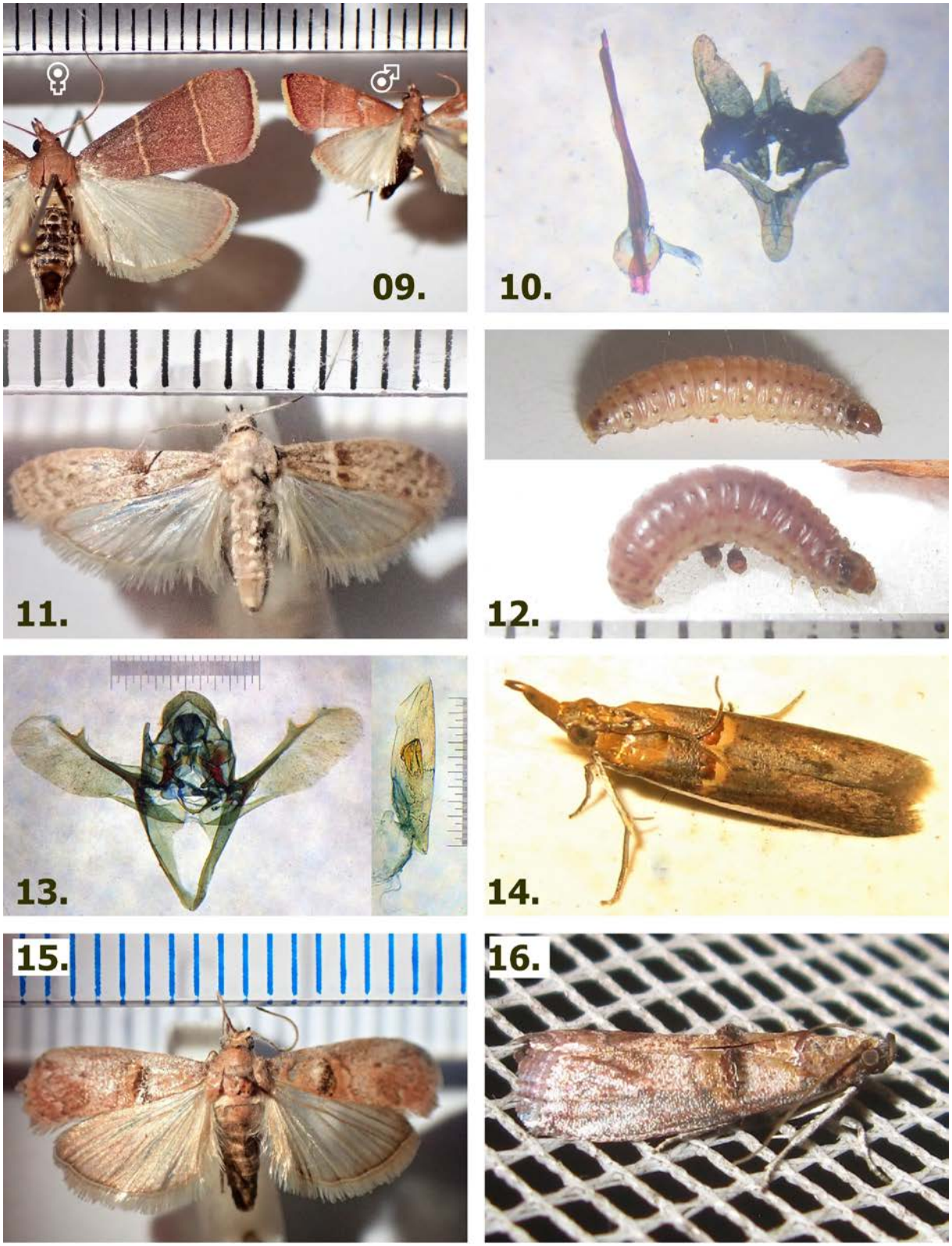

Plate 02:

Fig.09 - *Parachma lequettealis*, left: female, right: male
Fig.10 - *Parachma lequettealis*, male genitalia
Fig.11 - *Cadra cautella*, e.l. *Rhododendron simsii*
Fig.12 - *Cadra cautella*, larvae from *Rhododendron simsii*
Fig.13 - *Cadra cautella*, male genitalia
Fig.14 - *Etiella zinckenella*, Flic-en-Flac
Fig.15 - *Hypargyria metalliferella*, female, ws: 18mm
Fig.16 - *Hypargyria metalliferella*, female

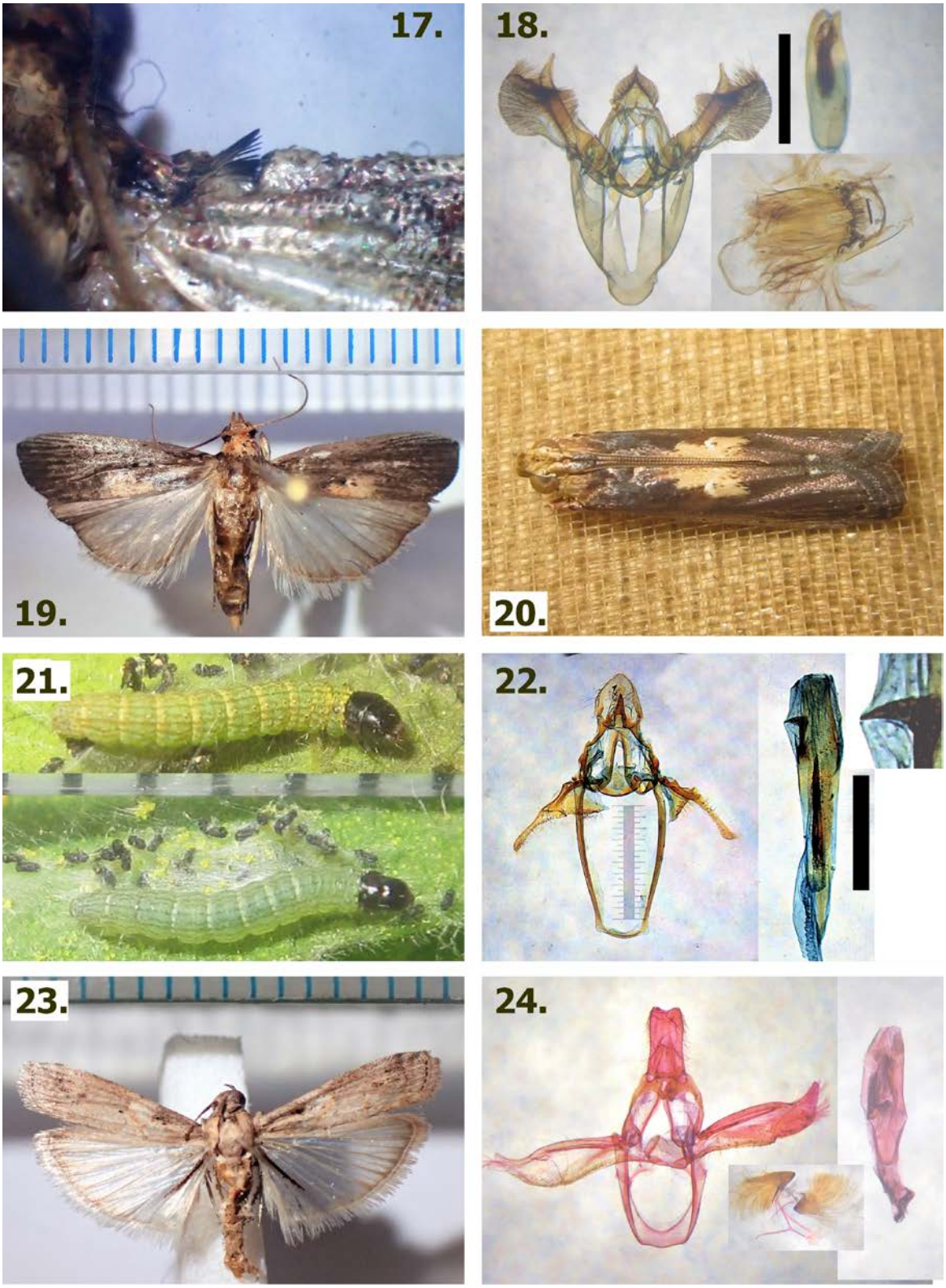

Plate 03:
Fig.17 - *Hypargyria metalliferella*, male, forewing
Fig.18 - *Hypargyria metalliferella*, male genitalia
Fig.19 - *Morosaphycita morosalis,* female, ws: 19.5mm
Fig.20 - *Morosaphycita morosalis*, e.l. *Rh. viscosa*
Fig.21 - *Morosaphycita morosalis*, larvae on *Rh.viscosa*
Fig.22 - *Morosaphycita morosalis*, male genitalia
Fig.23 - *Pseudophycitatella leveuleux*i, Blackriver
Fig.24 - *Pseudophycitatella leveuleuxi*, male genitalia, culcita reduced in size

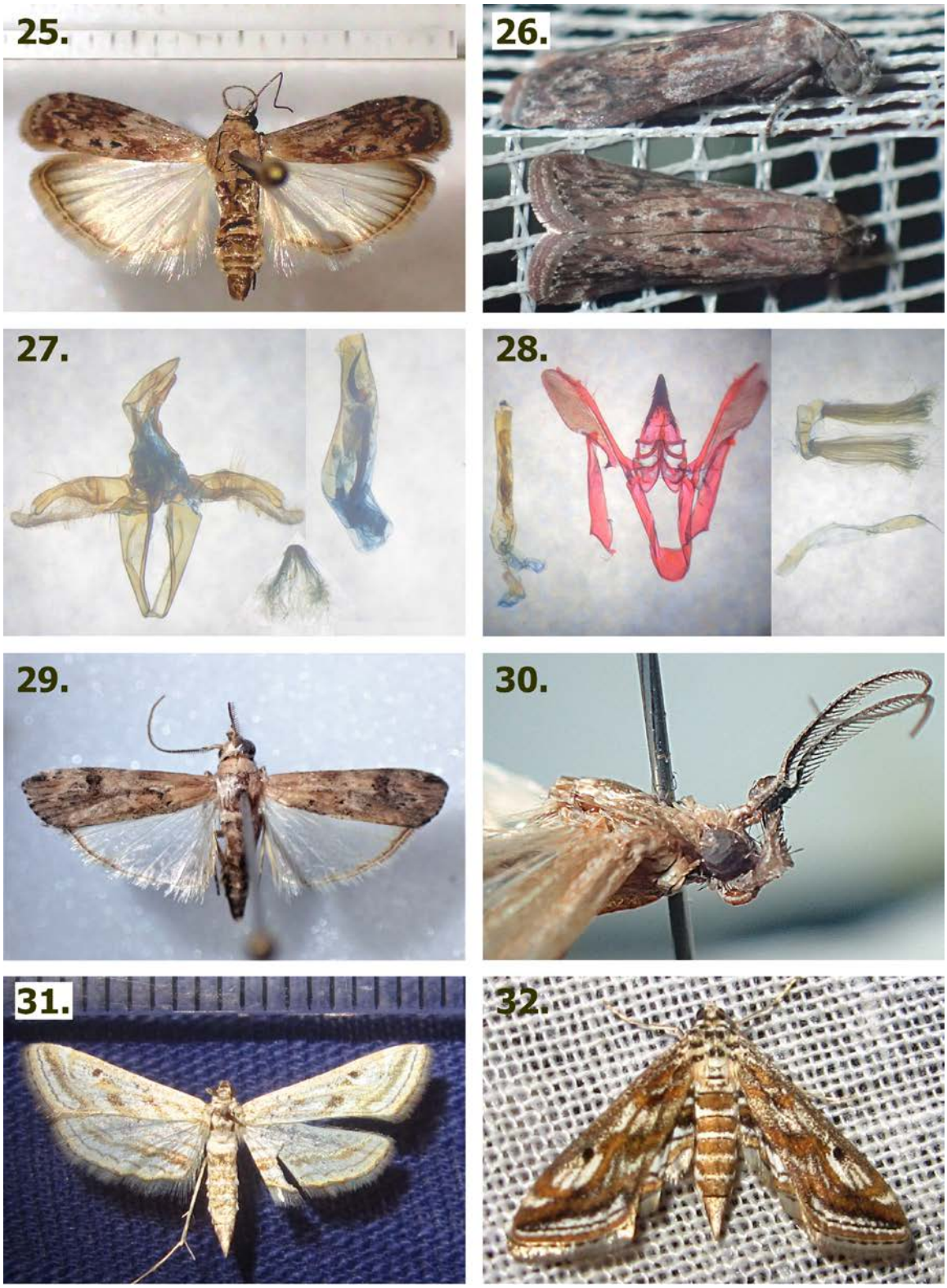

Plate 04:

Fig.25 - *Phycita demidovi*, wingspan 21mm
Fig.26 - *Phycita demidovi*, Réunion
Fig.27 - *Phycita demidovi*, ♂ genitalia, culcita 50%.
Fig.28 - *Spatulipalpia pectinatella*, male genitalia
Fig.29 - *Spatulipalpia pectinatella*, Bambous, ws: 23 mm
Fig.30 - *Spatulipalpia pectinatella*, Bambous
Fig.31 - *Parapoynx fluctuosalis*, Réunion, ws: 20 mm
Fig.32 - *Parapoynx fluctuosalis*, Mauritius

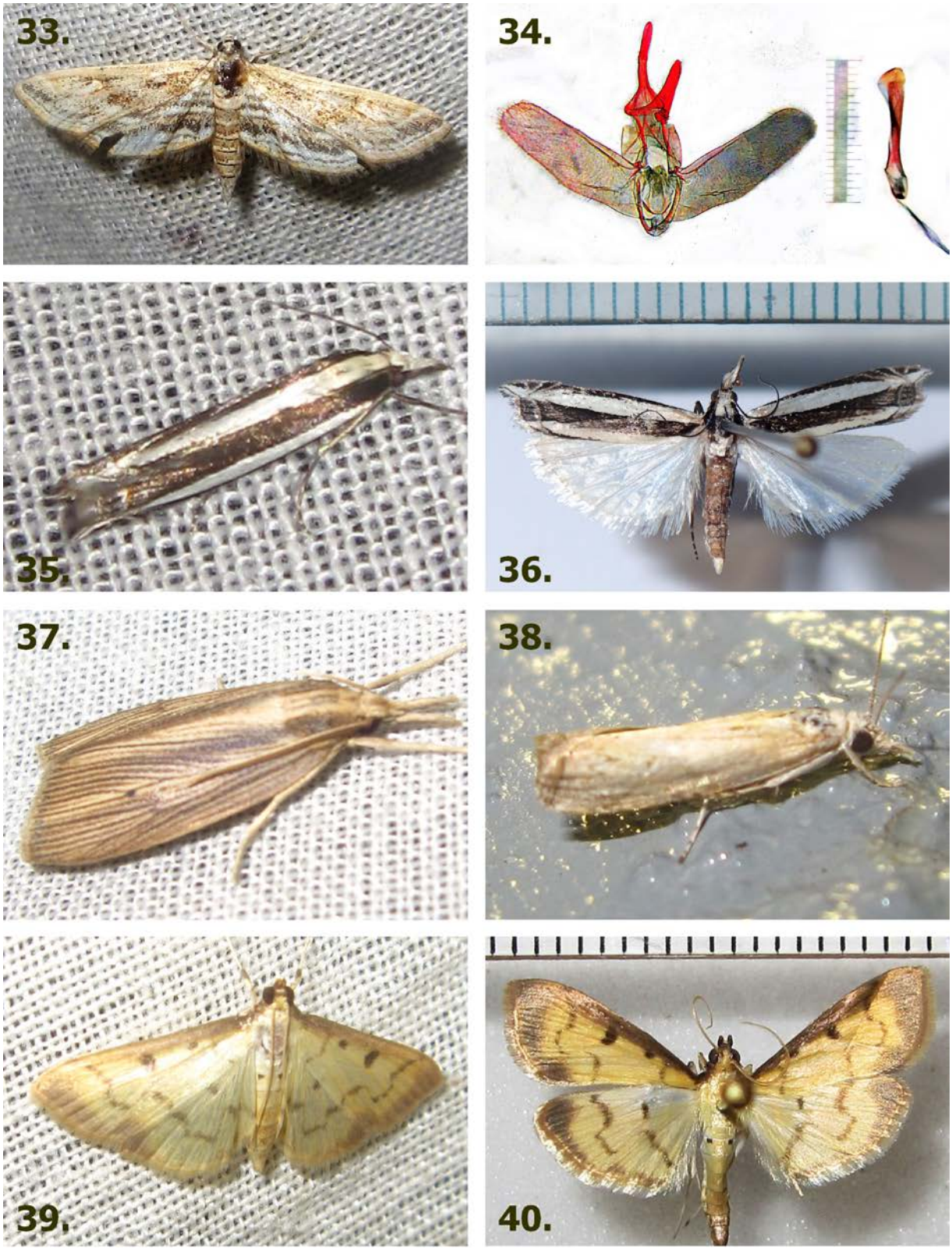

Plate 05:

Fig.33 - *Parapoynx fluctuosalis*, Mauritius
Fig.34 - *Parapoynx fluctuosalis*, male genitalia
Fig.35 - *Angustalius hapaliscus*, Bambous
Fig.36 - *Angustalius hapaliscus*, Bambous, ws: 19mm
Fig.37 - *Chilo sacchariphagus*, Bambous
Fig.38 - *Culladia achroellum*, Blackriver
Fig.39 - *Pyrausta pastrinalis*, female, Mahébourg
Fig.40 - *Pyrausta pastrinalis*, male, e.l. *Bidens pilosa*

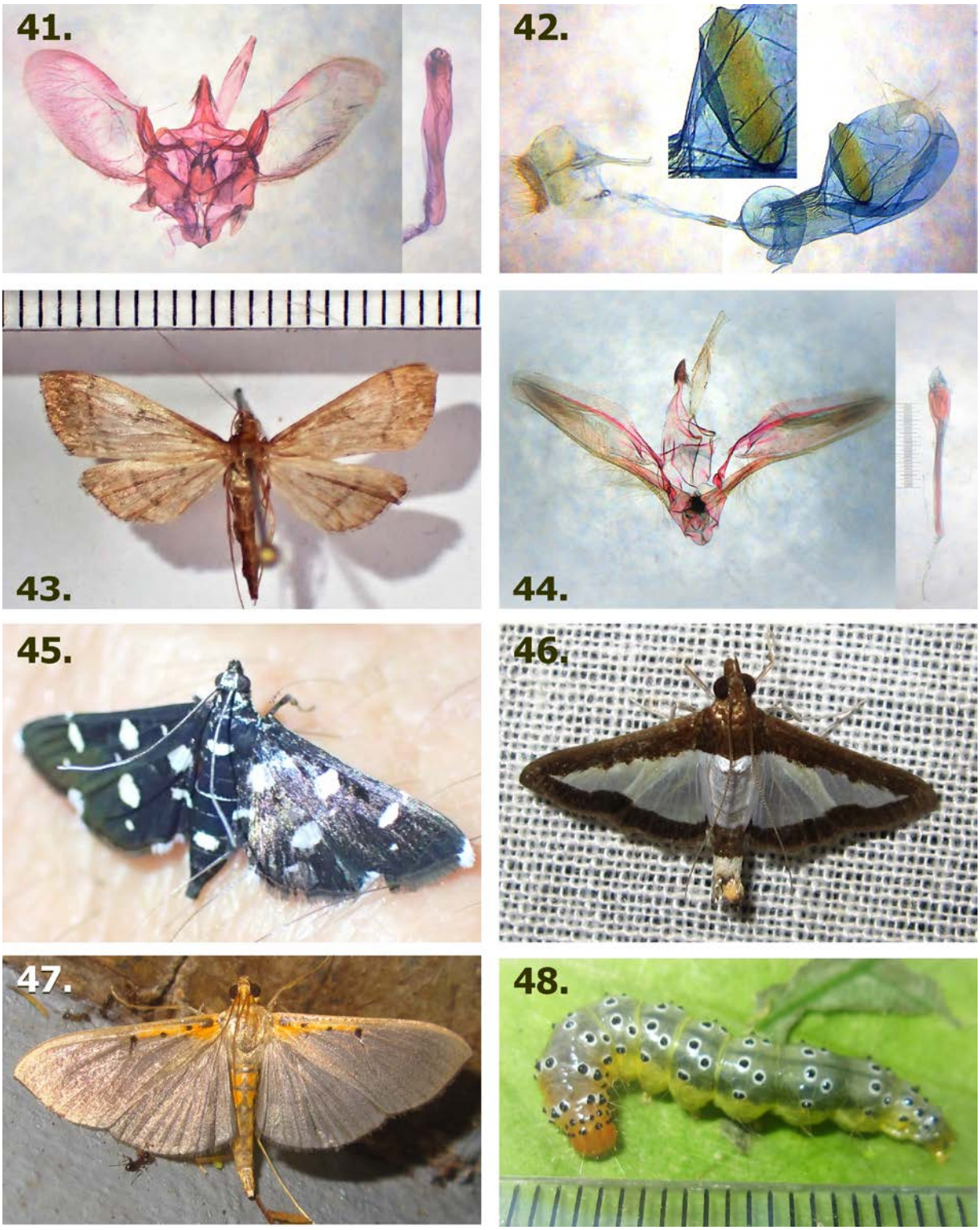

Plate 06:

Fig.41 - *Pyrausta pastrinalis*, ♂ genitalia, e.l. *B. pilosa*
Fig.42 - *Pyrausta pastrinalis*, female genitalia
Fig.43 - *Bradina admixtalis*, Bambous, female
Fig.44 - *Bradina admixtalis*, male genitalia
Fig.45 - *Bocchoris inspersalis*, Mahébourg
Fig.46 - *Diaphana indica*, Mahébourg
Fig.47 - *Filodes costivitralis*, Blackriver
Fig.48 - *Filodes costivitralis*, larvae from *Th. laevis*

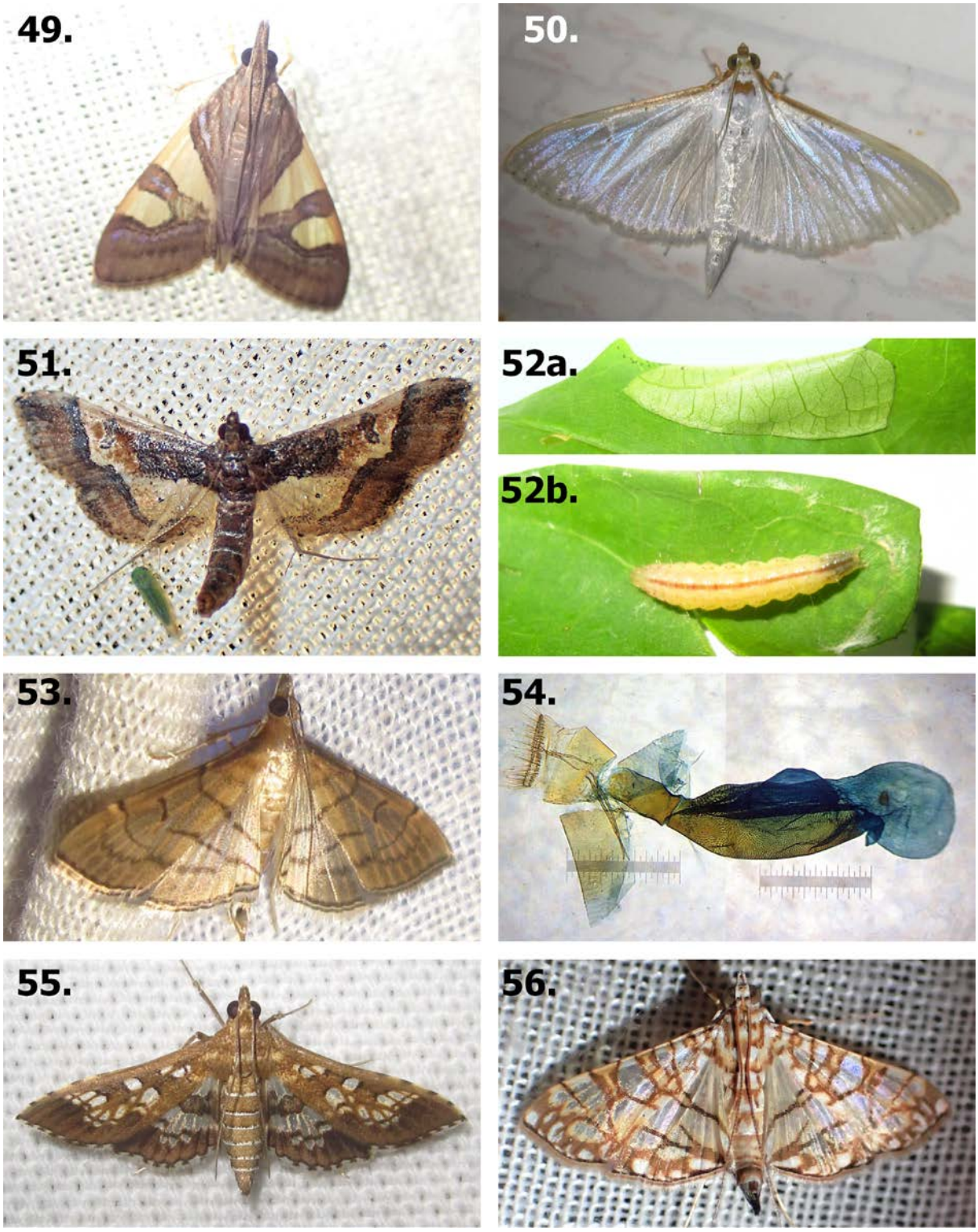

Plate 07:

Fig.49 - *Glyphodes mascarenalis.*, Mahébourg
Fig.50 - *Palpita vitrealis*, Flic-en-Flac
Fig.51 - *Hydriris ornitalis*, Mahébourg
Fig.52 - *Hydriris ornitalis*, larvae on *Ipomoea indica*
Fig.53 - *Marasmia trapezalis*, Bambous
Fig.54 - *Marasmia trapezalis*, ♀ genitalia, Bambous
Fig.55 - *Sameodes cancellalis*
Fig.56 - *Synclera traducalis*

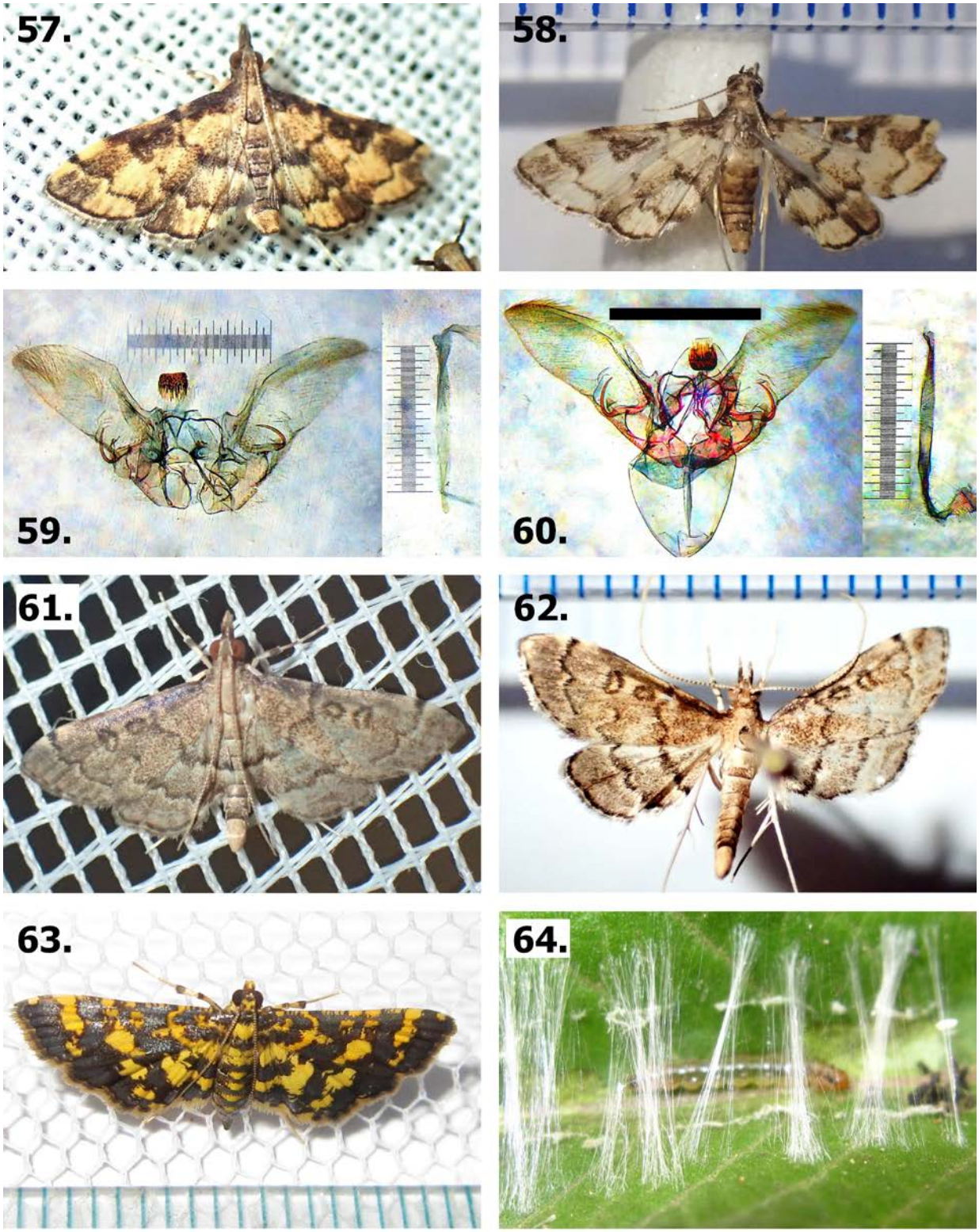

Plate 08:
Fig.57 - *Piletocera reunionalis*, Mahébourg
Fig.58 - *Piletocera reunionalis*, Mahébourg
Fig.59 - *Piletocera reunionalis*, male genitalia
Fig.60 - *Piletocera viperalis*, male genitalia, Blackriver
Fig.61 - *Piletocera viperalis*, Réunion
Fig.62 - *Piletocera viperalis*, Réunion
Fig.63 - *Eurrhyparodes tricoloralis*, e.l. *E. mollis*
Fig.64 - *Eurrhyparodes tricoloralis*, larvae o*n E. mollis*

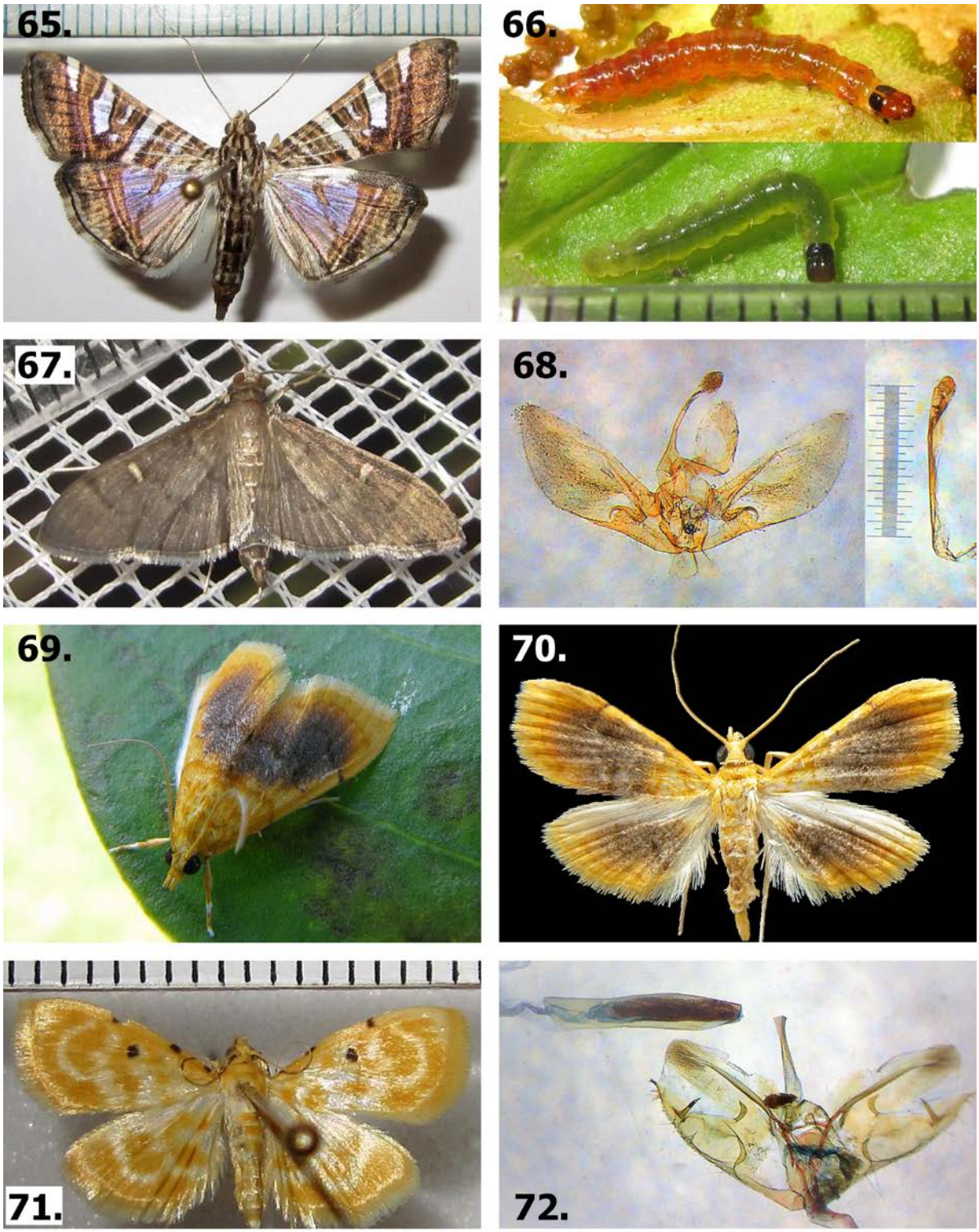

Plate 09:
Fig.65 - *Glyphodes stolalis*, Réunion
Fig.66 - *Herpetogramma minoralis*, larvae
Fig.67 - *Herpetogramma minoralis*, e.l. *Begonia* sp.
Fig.68 - *Herpetogramma minoralis*, male genitalia,
Fig.69 - *Mabra eryxalis* (photo: D. Martiré)
Fig.70 - *Mabra eryxalis* (photo: D. Martiré)
Fig.71 - *Notarcha quarternalis*, e.l. *Bidens pilosa*
Fig.72 - *Orphanostigma abruptalis*, Réunion, ♂ genitalia

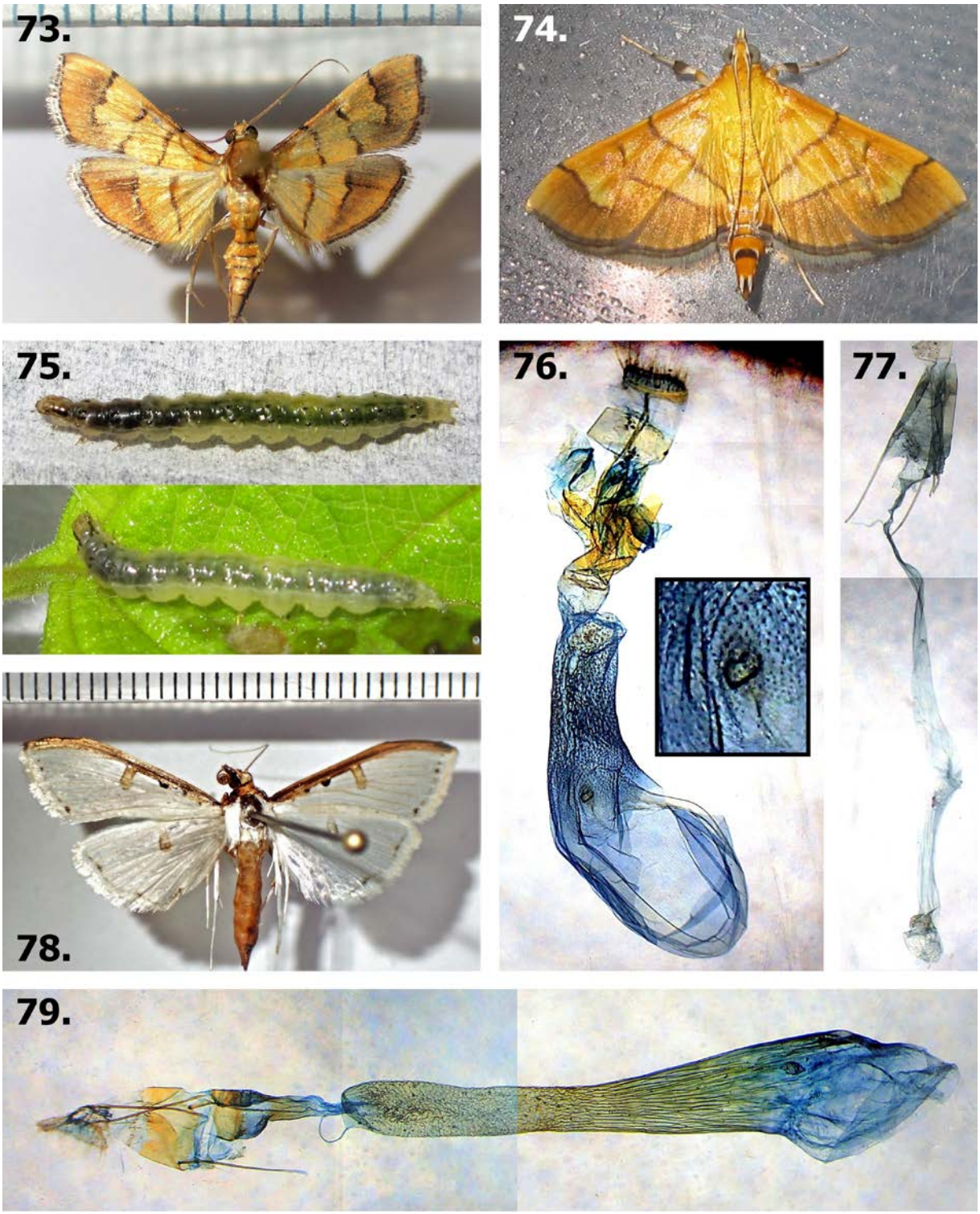

Plate 10:

Fig.73 - *Orphanostigma abruptalis*, Réunion
Fig.74 - *Salbia haemorrhoidalis*, Réunion, e.l. *L. camara*
Fig.75 - *Salbia haemorrhoidalis*, larvae on *L. camara*
Fig.76 - *Orphanostigma abruptalis*, Réunion, ♀ genitalia (signum x3).
Fig.77 - *Parapoynx fluctuosalis*, female genitalia
Fig.78 - *Palpita metallata*, male, Madagascar
Fig.79 - *Morosaophycita morosalis*, female genitalia (same specimen as Fig.19)

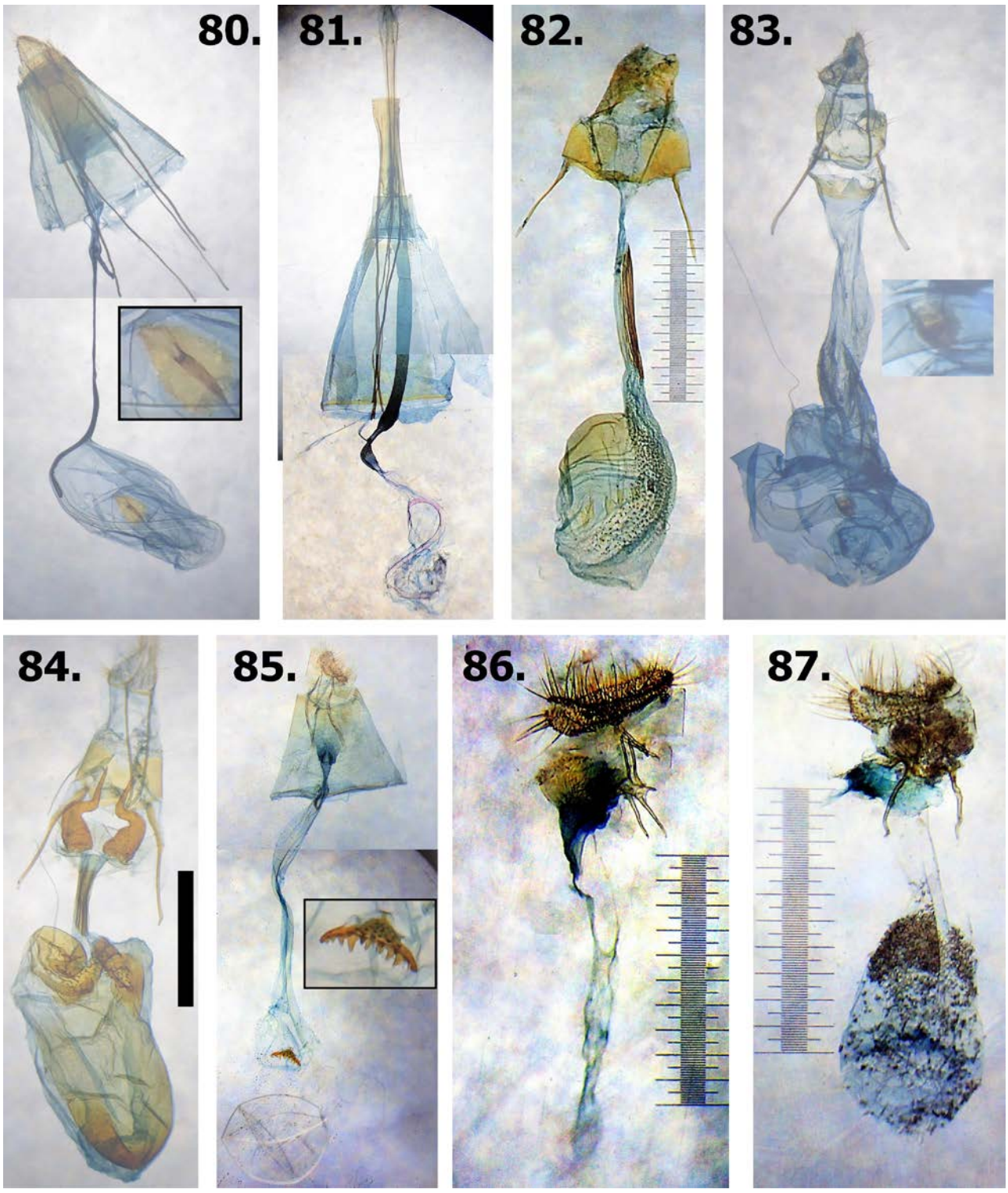

Plate 11: Female genitalia
Fig.80 - *Ocrasa nostralis*, female genitalia
Fig.81 - *Parachma lequettealis*, female genitalia
Fig.82 - *Cadra cautella*, female genitalia , e.l. *Rh. simsii*
Fig.83 - *Hypargyria metalliferella*, female genitalia
Fig.84 - *Phycita demidovi*, female genitalia
Fig.85 - *Bradina admixtalis*, female genitalia, (signum x3)
Fig.86 - *Piletocera reunionalis*, female genitalia
Fig.87 - *Piletocera viperalis*, female genitalia